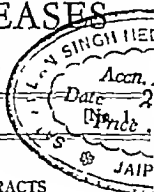


TROPICAL DISEASES
BULLETIN.

Vol. 37]

1940



SUMMARY OF RECENT ABSTRACTS

I CHOLERA *

Epidemiology

In the epidemiology of cholera butter (p 365) and prawns (p 366) have been incriminated. Carriers were found in a gaol kitchen by MAITRA *et al* (p 366) and in Calcutta PASRICHA *et al* (p 367) isolated *V. cholerae* from the stools of three of 2 000 persons not suffering from cholera, who were investigated. The contamination of water by pilgrims far from the place of origin of the disease has been demonstrated (p 365).

A large scale contamination of river water occurs in the valley of the river Yuan through the agency of the crews of junks who deposit urine and faeces in the river and during the process of transporting night soil in barges for the use of farmers (p 894). Living *V. cholerae* have been recovered from the river water but it is not held to be probable that infection travels far by this means and the disease was often found to spread upstream. In this area ROBERTSON and POLLITZER consider that flies play a part in transmission but that the principal source of infection is contaminated water.

GENEVRA (p 904) records a mortality of 60-80 per cent in an epidemic in Indo-China.

Aetiology

Cultivation—READ (p 894) obtained the best results in the differential isolation of *V. cholerae* by the use of a modification of Wilson and Blair's bismuth sulphite enrichment medium. GENEVRA and BRUNEAU (p 378) use peptone water containing 3 per cent. salt for isolation and GENEVRA (p 904) supports previous findings that *V. cholerae* is resistant to high concentrations of salt and can grow in 8 per cent sodium chloride. READ *et al* (p 895) show that both salt and organic matter are necessary for the multiplication and

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

survival of *V. cholerae* in artificial water. Equal concentration of other organisms does not appear to prevent multiplication and survival up to 5 or more days.

BAKERJEE (p. 578) uses Ramon's glucose medium for the cultivation of *V. cholerae* under anaerobic conditions. The pH does not change in this medium. To facilitate the study of the end products of glucose metabolism by *V. cholerae* and *V. El Tor* BAARS (p. 372) added chalk to the culture medium, thus neutralizing the acid formed and preventing auto-sterilization. The ratio of produced carbon dioxide and fermented sugar was found to be 0.88 for the Voges-Proskauer positive *V. El Tor* and 0.52 for the *V. P* negative *V. cholerae*.

BOSTE (p. 885) notes that the maximum growth of *V. cholerae* on papain-mutton agar takes place when the digestion of the mutton has been allowed to proceed for 2 hours. VARDON and DATTA ROY (p. 377) have elaborated a cheap papain-casein medium satisfactory for the preparation of therapeutic bacteriophage.

Identification.—Discussing the criteria for the absolute diagnosis of the true cholera vibrio TAYLOR (p. 368) re-states the view adopted by bacteriologists in India that it belongs to Group O No 1 of Gardner and Venkatraman, is non-haemolytic and gives characteristic biochemical reactions. The fact that vibrios possessing H antigenic fractions in common with *V. cholerae* or belonging to O groups other than "O No 1" are found in both healthy persons and cholera patients is not surprising when it is realized that such vibrios are found in water in which the chance of contamination with cholera is absolutely excluded. A similar argument is advanced by TAYLOR and ARUJA (p. 378) who consider that the H flagellar antigen may be common to many vibrios and that therefore agglutinability with Inaba HO serum is not an adequate test for true *V. cholerae*. Vibrios are constantly found in wells, tanks and rivers of Northern India where cholera is not endemic but none of these agglutinate with pure O cholera serum. At the Medical Research Institute Shillong (p. 887) it was found impossible to transform agglutinable into inagglutinable vibrios. Vibrios are almost universally present in natural water sources but none of those found were agglutinable.

MERTENS and MOCHTAR (p. 801) found a lack of serological unity in 32 strains of vibrios, agglutinable with HO cholera serum isolated from stools of persons not suffering from cholera. They confirm that anti-O cholera sera are more specifically diagnostic than HO and that classification by fermentation reactions alone is insufficient. ROWSE (p. 369) agrees that monovalent antiserum O Inaba is specific, and states that it is preferable to antisera O Ogawa and Napoli for the identification of *V. cholerae*. At the beginning of an epidemic the first cases are not always typical and he therefore advises that the specific biological characters of the vibrios should be determined before the official announcement of cholera is made. [This does not appear to mean that no control measures should be taken before specific diagnosis is made.]

LINTOX *et al.* (p. 370) discovered that in strains of *V. cholerae* isolated early in an epidemic there was a lipod-polysaccharide complex which was absent from strains isolated later and from those maintained for long periods in laboratories and in water and carrier strains. In studying antigenic structure therefore it is advisable to use freshly isolated strains.

Russo (p 369) claims that 0.5 per cent lithium chloride 0.1 per cent phenol or alcohol in agar media inhibit the development of cilia and therefore produce vibrios with purely O antigens. Of these the lithium chloride is the most effective and its use should help to bring about concordant results in different laboratories.

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Studying the inhibition of cholera phages by vibrio extracts and the precipitin reaction of these extracts MAITRA (p 900) shows that two groups of vibrios may be distinguished (1) smooth *V. cholerae* and *V. El Tor* of O subgroup 1 and (2) water and other vibrios.

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In treatment MASSIAS (p 380) injects intravenously 20 cc of a 20 per cent solution of sodium chloride to overcome hypochloraemia and this dose may be repeated in 12 hours. Mortality was thus lowered to 22 per cent, but he suggests that 10 per cent. may be a better concentration to use.

THOMAS and TING (p 380) consider that the dangerous symptoms observed after the use of intravenous salines are due to pyrogenic substances in the distilled water used and give instructions as to the careful preparation of the materials. Rigor frequently follows the use of intravenous saline and to prevent this BANERJEE (p 381) uses the solution at a temperature as much below 36.7°C (98°F) as the rectal temperature is above it and vice versa. Thus with a rectal temperature of 38°C. the solution should be at 35.4°C. High rectal temperature may first be reduced by an enema of 15 to 20 ounces of ice-cooled saline.

PASRICHA *et al* (p 903) compared 5 methods of treatment in comparable groups of patients. Bacteriophage apparently gave better results than calomel, potassium permanganate, essential oils or M & B 693 and the authors advise its adoption as a routine. CHATTERJEE and DEO (p 381) combine A phage with others in treatment and give information as to the methods of bottling phage suspension.

Control and Vaccination

TAYLOR (p 368) emphasizes the importance of not delaying measures to combat cholera until identification of the vibrio which is frequently difficult has been achieved. In the Philippines SMITH (p 382) reports that the finding of the cholera vibrio [*sic*] in the stools whether agglutinable or not is enough to warrant isolation and treatment.

In addition to vaccination ROBERTSON and POLLITZER (p 883) have attempted to control the water borne cholera of the Yangtze basin by chlorination of the individual buckets of water carriers to a concentration of 0.9 p.p.m.

GENEVRA (p 904) reports that 13,513,350 vaccinations were carried out in Indo-China during an epidemic and considers that when fully performed it gives complete protection. The majority of these were by the single dose method but even so appeared to be efficacious. GENEVRA *et al* (p 904) unable to find any cause other than vaccination to account for the rapid disappearance of a small epidemic in Tonking attribute this to the 280 vaccinations undertaken almost immediately after the onset. CARO (p 383) quotes figures to show

the value of vaccination in an epidemic in Haiphong in 1937. Shortly after a large scale vaccination was carried out the epidemic began to die away and of the later cases 94 per cent. had not been vaccinated. On the other hand, VOGEL and RIOU (p. 905) record a report that spontaneous arrest of an epidemic can take place in non-vaccinated villages, and there may be recrudescence in vaccinated areas. In Annam little difference in mortality between vaccinated and non-vaccinated villages was seen. QUENARDEL further (p. 384) states that reports on the value of vaccination in Tonking have not all been favourable

C Wilcocks

TRYPANOSOMIASIS

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LESTER (p. 7) considers that large epidemics of sleeping sickness are now unlikely since contact between medical staffs and populations is close enough for outbreaks to be dealt with early. Care should be taken that control measures should fit in with general development of the countries. He reviews the disease in a number of colonies. VOGEL and RIOU (p. 8) report that 41,295 new cases were discovered in French West African colonies in 1937.

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LONGLEY *et al.* (p. 12) give a technique for infecting fowl embryo with trypanosomes, various species of which can be cultivated in this manner. No change in virulence or arsenic resistance of a strain of *T. rhodesiensis* so cultivated could be found. CHABAUD (p. 12) also succeeded in infecting fowl embryo with *T. brucei* and *T. equinum* but failed with *T. lewisi*. LWOFF and CECALDI (p. 13) successfully cultivated a strain of *T. gambiense* which had been maintained in guinea-pigs for over a year but found that in a culture medium containing human blood the blood of certain individuals inhibits growth while that of others permits it. Working with *T. gambiense* and *T. congolense* REICHENOW (p. 14) shows that *G. morsitans* may be infected by feeding upon cultures of the trypanosomes and that under certain circumstances these trypanosomes may undergo complete development in the fly.

NAKH (p. 15) gives details, which cannot be further abstracted, of the breeding preferences of *G. morsitans* and *G. tachinoides* in relation to pupal density and mortality and to the microclimate of the breeding grounds.

KUVERT (p 17) comparing the sleeping sickness seen in Tabora Tanganyika Territory in 1929 and in 1938 considers that the trypanosomes have increased in virulence infection of the c.s.f. is now earlier and glandular enlargement not so frequent a sign that the trypanosomes more easily pass the lymphatic barrier

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LESTER (H M O) Certain Aspects of Trypanosomiasis in Some African Dependencies.—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol 33 No 1 pp 11-25 Discussion pp 25-36 (O BRIEN (A J R) GORDON (R M) DAVEY (J B) CHESTERMAN (C. C) BEVAN (L E. W) & LESTER (H M O) (in reply))

The author begins his paper by pointing out that in partially developed African dependencies wealth and general well being depend upon population A disease such as sleeping sickness which decreases the population may be a serious economic problem. In British territory the medical budget is usually about one tenth of the total expenditure and this can hardly be increased consequently the economic side of the question is of paramount importance Lester stresses this point because there is sometimes a tendency for the occurrence of a few cases of sleeping sickness to be regarded as a calamity He thinks that provided there is such adequate contact between the medical staff and general population that large increases in the amounts of the disease do not pass unnoticed, there is no fear of such wholesale epidemics and depopulation as occurred in the past. Treatment is now fairly effective and by this means alone it is possible to reduce an epidemic to reasonable proportions Whilst constant vigilance is necessary fear of possible fresh disasters should not lead to the imposition of unnecessarily severe and irksome restrictions.

Measures for the control of sleeping sickness ought not to interfere with general development but should foster it as much as possible. Settlement of population in unsuitable areas may cause soil impoverishment and erosion and vastly more damage may result from poor nutrition and famine than would have been caused by the disease.

Before going on to discuss the problems in the various African dependencies, Lester emphasises that there is a fundamental difference between the populations of East and West Africa. In Nigeria people live in towns, villages and hamlets. A close contact between man and tsetse may cause a high rate of infection in a village but such a community is comparatively easy to protect. In East Africa the majority live in family groups on their farms. The infection rates are therefore lower but the scattered nature of the population makes protective measures more difficult

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The author gives a very interesting account of the present state of affairs in Tanganyika, Uganda, Kenya, the Sudan and Nigeria. He summarizes his paper as follows —

"Although epidemic sleeping sickness may cause serious depopulation, the occurrence of a few cases should not be regarded as a calamity. Provided that there is adequate contact between the medical staff and general population there is no fear of such wholesale devastation as occurred formerly. Mass treatment of itself will reduce an epidemic to reasonable proportions. Constant vigilance is necessary but fear of fresh disasters should not lead to unnecessarily severe and irksome restrictions.

"At present the disease is fairly mild, though patches of virulent infection occur. The proportion of severe nervous cases in Uganda, the Congo and the Sudan is not much higher than in Nigeria. Control measures should not interfere with general development. The restriction and settlement of population in unstable areas might cause more damage through poor nutrition and famine than sleeping sickness would have done.

Most of Tanganyika Territory is infested with tsetse. Sleeping sickness is no longer serious as the population of infected areas has been concentrated in special settlements. There were only 188 cases in 1937. Cattle trypanosomiasis is the important problem. The fly free areas are over populated and overstocked. Soil impoverishment and erosion are increasing, and will continue to do so unless spread of tsetse is stopped and new areas reclaimed. A cattle assess on the four to five million cattle there would provide funds for soil and grazing control for tsetse research. A cheap and easy method of reclamation, to be used when required, is essential.

"In Uganda and the Sudan sleeping sickness is under control. The populations of the old epidemic areas have been moved to less dangerous regions. They are inspected regularly and cases treated. In both countries the restriction of population is causing overcrowding and soil impoverishment. It is hindering development and will have to be reconsidered.

"In Nigeria the disease is being controlled by mass treatment and the establishment of dispensaries, protective clearing by communal labour and, as a last resource, the movement and concentration of population. 300 000 cases have been treated in the last 7 years. In many of the main epidemic areas the infection rate is now a tenth of the old figure. In moving population the object is to secure the maximum improvement and development and to try to make the new settlements demonstrations for the rest of the country. People are being helped to build model compounds, and villages are being laid out properly."

The paper was followed by a discussion in which Dr A. J. R. O'Brien Professor R. M. Gordon Dr J. B. Davey Dr C. C. Chesterman and Mr L. E. W. Bevan took part.

IV Yorks

VOGEL (E.) & RIOU (M.) Les maladies épidémiques, endémiques et sociales dans les colonies françaises pendant l'année 1937. Trypanosomase. [Epidemic, Endemic and Social Diseases in the French Colonies during 1937 Sleeping Sickness.]—*Ann. de Méd. et de Pharm. Colon.* 1939 Apr. Vol. 37. Supplement. pp 355-402. With 3 maps.

In the African colonies ravaged by sleeping sickness, viz., French West Africa, Togo, Cameroons and French equatorial Africa, 2,770,574 people were examined in 1937 (2,977,268 in 1936). 41,295 new cases were discovered (57,162 in 1936) and 94,139 old cases have been reviewed.

In French West Africa the number of cases remains high. The situation is serious in the Ivory Coast and in Togo although the new morbidity is falling old foci are always active. In the Cameroons the disease throughout the whole colony has been reduced to a state of feeble endemicity there are only few epidemic foci against which all effort in 1937 has been directed. In French equatorial Africa the endemicity is feeble and undergoing retrogression throughout the territory it only maintains itself in a few foci of which the two most important are those of Haute Sangha and Ouham.

It is impossible to summarize this lengthy paper which is filled with figures of almost astronomical dimensions showing the number of people examined of new cases found and of early ones re-visited in the various parts of each of the French West African and equatorial colonies those interested must consult it in the original. H Y

SICÉ (A) & TORRESI (F) Répartition de la trypanosomiase humaine au Soudan français. [Distribution of Sleeping Sickness in French Sudan.]—*Bull Soc Path Exot* 1939 May 10 Vol 32 No 5 pp. 560-565 With 1 folding map

A brief account is given of the history of sleeping sickness work in French Sudan since it was first discovered by BOUFFARD in 1908. In 1933 JAMOT made a rapid survey of the territories of Tougan Nouna Koutiala Ségou and Bamako he found 1,891 cases of the disease. Subsequent missions during the following 6 years discovered 7,631 patients of whom 6,212 were alive at the end of 1938 the mortality was thus 18.59 per cent. The patients were practically untreated during the years 1933 to 1935.

The authors then pass on to a discussion of the present distribution of the disease in French Sudan. Sleeping sickness is mainly found along the Volta Noire the Bani and that portion of the Niger in the vicinity of Bamako. It is thus most prevalent in those portions of the colony which adjoin the Ivory Coast and French Guinea. The distribution of the disease along the course of these rivers is dealt with in detail and the article is illustrated by an excellent map in which the foci are plainly marked with signs indicating the intensity of the disease in the various localities. Those interested should consult the map. The paper ends with some observations on the tsetse fly responsible. Apparently *G. tachinoides* is much the commonest tsetse but *G. palpalis* and *G. morsitans* are also found.

H Y

CORSON (J F) A Summary of the Work of the Research Scheme on *Trypanosoma rhodesiense* during the Years 1930 to 1938.—*East African Med J* 1939 June Vol 16 No. 3 pp 84-92 [51 refs.]

This summary of the work on trypanosomiasis done by Corson during the last eight years was written at the request of Dr R. R. Scott Director of Medical Services, Tanganyika. The results of Corson's researches have been published in 45 articles which have appeared in the *Journal of Tropical Medicine & Hygiene*, the *Annals of Tropical Medicine & Parasitology*, *Transactions of the Royal Society of Tropical Medicine & Hygiene* and the *Kenya Medical Journal*. The author points out that the scheme of work was begun on the recommendation

of authorities in England who considered that experimental investigation of *Trypanosoma rhodesiense* was needed. The following programme of work was recommended in the memorandum —

- " 1 Repeated passages of *T. gambiense* through *Glossina morsitans* to domestic and laboratory animals.
- " 2 Repeated passages of *T. rhodesiense* through *G. palpalis* to domestic and laboratory animals.
- " 3 The study of the trypanosomes of game and their development in and transmission by the *G. morsitans* group of flies.
- " 4 Epidemiological studies on *T. rhodesiense* infections and their relationship to game.
- " 5 The study of the ingested blood in *G. morsitans*.

On considering this programme Corson felt that it was best to select such questions of practical importance as seemed to offer a prospect of definite results being obtained. The third, fourth and fifth items of the above list could not well be undertaken and the second item was not investigated since Duke's laboratory at Entebbe was better equipped to deal with it. The most useful work that Corson could undertake seemed to be the study of the question of animal reservoirs of *T. rhodesiense* in particular to see whether *T. rhodesiense* obtained from a sleeping sickness patient could retain its infectivity to man during passages through ruminant animals (sheep, goats and antelopes). Pending the organization of breeding out tsetse flies, it was decided to begin this work by mechanical passages in order to show any influence of the vertebrate host on the trypanosomes, and afterwards to introduce cyclical passages by *G. morsitans*. This work was commenced in 1930 and has been the chief subject studied.

Corson then summarizes his work under the following heads — (1) The animal reservoir question, (2) Repeated cyclical passages of *T. gambiense* through *G. morsitans*, (3) The prophylactic action of Germanin against *T. rhodesiense* in white rats, (4) Other investigations including (a) Infection of domestic fowls and ducks and of francolins and guinea fowl, (b) Infection of hyrax, (c) Dikdiks in tsetse fly areas, (d) The influence of cyclical passage through *Glossina* on *T. rhodesiense*, (e) Observations on tsetse flies, (f) *T. brucei*.

As stated previously an account of all this work has already been published and fully noticed in this Bulletin. II' Y

Corson (J. F.) The Infections produced in Sheep and Antelopes by a Strain of *Trypanosoma rhodesiense* — Trans. Roy. Soc. Trop. Med. & Hyg. 1939 June 29 Vol. 33 No. 1 pp. 37-48.

Throughout the last 4 years Corson has conducted an experiment devised with the object of ascertaining whether a strain of *T. rhodesiense* would lose its infectivity to man during passages in ruminant animals (sheep and antelopes) and *G. morsitans*. Progress reports have appeared from time to time [this Bulletin 1937 Vol. 34 p. 921 1939 Vol. 36, p. 208 p. 662].

In this final note Corson deals with the infections produced in sheep and antelopes by his strain of *T. rhodesiense*. Transmission from sheep to sheep was usually made by batches of flies in boxes. The antelopes were bitten by single flies known to be infective. The sheep and antelopes were not examined very frequently or over long periods, as it was not considered to be of much importance to try to find out how long each animal remained infected. All the sheep seemed to remain infected until they died, apparently of trypanosomiasis.

the antelopes varied considerably in resistance to the infection some seemed to resist completely whilst others got a fatal infection. In general it may be said that all the infected animals remained infected long enough for the trypanosomes to be transmitted many times by tsetse flies if the animals had been living under natural conditions in tsetse fly areas.

Details of the experiments are given in a series of tables which must be consulted in the original by those interested. W Y

DUKE (H Lyndhurst) Remarks on Dr Corson's Paper on the Infectivity of *T. rhodesiense* to Man. [Correspondence]—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol 33 No 1 pp 127-130

In this note Duke makes some comments on Corson's recent paper entitled "A Fourth Note on the Infectivity to Man of a strain of *T. rhodesiense*" [this *Bulletin* 1939 Vol 36 p 208]. There are three main views about the affinities of *T. rhodesiense* viz. that it is a variant of *T. gambiense*, that it is a human strain of *T. brucei*, and that it is a separate species. Corson writes "I think it may be concluded that *T. rhodesiense* is a parasite not only of man but also of wild and domestic animals in sleeping sickness areas and that it may retain its infectivity for at least several years and perhaps indefinitely while living only in animals and tsetse flies." Duke points out that it is not clear from this which of the three views Corson favours. He enquires whether the range of the parasite is restricted to sleeping sickness areas merely because in the absence of man its presence passes unnoticed or because it is derived from and is really dependent on man.

Duke stresses that the evidence at present available indicates that *T. rhodesiense* is considerably less adapted biologically to man and his domestic animals than to the wild game and he agrees with Corson that final conclusions about the game reservoir cannot be based on the behaviour of one or two strains kept under laboratory conditions.

Duke criticizes Corson's statement that "A demonstration of a loss of infectivity for a number of volunteers is therefore of less practical importance than a demonstration of continued infectivity." For various reasons he considers that negative evidence is just as important as any evidence of the instability of the power of *T. rhodesiense* to infect man will help us to fix its true affinities.

Corson's paper supplies ample confirmation of the conclusions reached by Duke in Uganda that individuals differ in their natural resistance to trypanosomes. Duke continues by discussing this point in some detail, and deals in particular with the question of the characteristic local reaction at the site of the infecting bite. He also gives illustrations from his own experimental cases indicating that individuals may respond differently to the bites of infective flies and in the light of these observations he discusses an experiment recorded by Corson suggesting that two different flies infected from the same animal may differ in their power to infect the same man.

Duke also stresses the fact that on several occasions he has called attention to observations which suggest that the nature of its mammalian host may influence the pathogenicity of a trypanosome for man. He found that attempts to transmit from an antelope to man by cyclically infected flies might fail, whereas similar attempts to transmit

the same strain from a monkey succeeded. In view of this fact certain of Corson's experiments, in which flies were fed on the volunteer 2 or 3 weeks after the batch was removed from the test monkey used to detect the presence of infected flies in the batch preparatory to their isolation by means of rats, are open to criticism. As Corson himself acknowledges 2 or 3 weeks would give time for a fly to acquire infection from the test monkey and once this becomes possible subsequent tests are open to doubt.

In conclusion, Duke wholeheartedly agrees with Corson's final recommendation, that while strains of the polymorphic trypanosomes should be thoroughly tested on man, he sees no reason to confine this investigation to areas where sleeping sickness occurs. The recognition of a human strain from antelope in such an area would not help very much although a negative finding would be valuable. W 1

LONGLEY (B J) CLAUSEN (N M) & TATUM (A L.) Cultivation of Various Species of Trypanosomes in the Developing Chick Embryo.—*Proc Soc Experim. Biol & Med.* 1939 June. Vol 41 No. 2 pp 365-368

It occurred to the authors to ascertain whether an arsenic fast strain of *T. rhodesianus* would lose its resistant property after cultivation on chick embryo. In their earlier work they employed the usual window technique, but in their later experiments they used a simplified method. Eggs were incubated for 8 to 10 days. By means of a sterile dissecting needle, two small holes were made through the shell previously cleaned with alcohol. One hole was made into the air sac and the other immediately over the embryo. The inoculum consisting of highly infected rat blood was injected into the allantoic cavity by means of inserting a 28-gauge needle parallel to and immediately under the chorio-allantoic membrane. The volume of inoculum for each egg was approximately 0.5 cc. After the inoculation the holes in the shell were closed with melted paraffin. A heavy infection in embryo blood was regularly obtained, and caused the death of the embryos in 4 to 5 days.

Subcultures were made on the fifth day and by this means the strain was maintained in chick embryo for 8 generations during a period of 41 days. No change in virulence or in arsenic resistance occurred during this period of observation.

In subsequent experiments it was found that *T. equiperdum*, *T. brucei*, *T. evansi* and *T. hispanicum* were equally readily cultivated in chick embryo for 15 days and maintained their normal virulence to rats. There appeared to the authors no reason why these strains could not have been cultivated indefinitely. *T. lewisi* was also cultivated, but not very satisfactorily because of its very slow growth. In conclusion, the authors remark that none of these species of trypanosome was infective for the hatched chick. W Y

CHABAUD (A.) Infection de l'embryon de poule par quelques trypanosomes pathogènes. [Infection of the Chicken Embryo by Certain Pathogenic Trypanosomes].—*Bull Soc. Path. Exot.* 1939 May 10 Vol 32 No. 5 pp. 489-492.

In view of the remarkable sensitiveness of the chick embryo to certain blood spirochaetes, the author decided to see whether various trypanosomes would also infect.

The first experiments were conducted with *T. rhodesiense*. Eighty fecundated eggs were divided into 8 series and placed in the incubator for 7 to 10 days and the allantoic membrane inoculated with 2 drops of defibrinated or citrated blood containing about 50 trypanosomes per microscope field. As a control 10 mice were inoculated intraperitoneally and a fowl into the caruncle. All the mice were dead in 5 days but the fowl was resistant. The embryos inoculated with the citrated blood all became infected as did also half of those inoculated with defibrinated blood. Parasites appeared in the embryo blood on the 4th day and reached their maximum (over 20 per field) on the 6th day after which they progressively disappeared. The infection was passed through a series of 15 eggs and then inoculated into a mouse which it killed in 5 days.

Experiments with *T. brucei* and *T. equinum* gave comparable results but attempts to infect eggs with *T. lewisi* failed. { }

LWOFF (M) & CECCALDI (J). Culture *in vitro* d'une souche de *Trypanosoma gambiense* d'isolement ancien. [Culture *in vitro* of an Old Strain of *T. gambiense*].—*Bull. Soc. Path. Exot.* 1939 July 12. Vol. 32. No. 7. pp. 721-726. [15 refs.]

The authors refer to the hypothesis of REICHENOW that strains of pathogenic trypanosomes which have been maintained for years by passage through laboratory animals cannot be cultured and lose their capacity of developing in the tsetse. In the present work Lwoff and Ceccaldi used a strain of *T. gambiense* obtained at Yaoundé (Cameroons) and sent to Mesnil in December 1934 as it exhibited little pathogenicity for mice it had been maintained in guinea-pigs. In January 1936 an attempt was made to infect *Glossina*, but only a single intestinal infection was obtained among the 51 flies used. An attempt to culture the trypanosome was made on 28th January 1939 i.e. 4 years after the strain was isolated. The medium employed was that of RAZGHA [this *Bulletin* 1930 Vol. 27 p. 244] but the infected blood was withdrawn into polyanethol sulphate of sodium liquoide Roche as an anticoagulant instead of sodium citrate as recommended by BRUTSAERT and HENRARD [this *Bulletin* 1938 Vol. 35 p. 704].

In the initial attempt 6 tubes were inoculated and kept at 28°C. For the preparation of the medium in 3 of these tubes the blood of one person was employed for that in the remaining 3 tubes the blood of a second person. On the 10th day all the tubes were positive. The second inoculation also into 6 tubes was made on 7th February. The blood of an individual, L., was used for the medium in 2 of these tubes that of M. in 2 others and that of S. in the remaining 2 tubes. Only two of the tubes viz. those containing medium made from the blood of individual M. produced cultures.

At the 3rd passage 6 tubes were again inoculated but this time all the tubes contained medium made from the blood of individual A. All tubes produced rich cultures. In the 4th, 5th and 6th passages the same blood was used for the medium and here again all the cultures were very abundant.

From this work the authors conclude that the blood of certain individuals permits the cultivation of trypanosomes whilst that of others inhibits it. W. Y.

REICHENOW (Eduard) Ueber die Entwicklungsfähigkeit der Kulturformen von *Trypanosoma gambiense* und *T. congolense* in Glossinen [The Capacity of Culture Forms of *T. gambiense* and *T. congolense* to develop in Glossina.]—*Arch f Schiffs u Trop Hyg* 1939 May Vol. 43 No 5 pp 197-202.

In previous papers the author has drawn attention to the parallelism between the development of trypanosomes in culture and in Glossina: the flagellates develop in the same way and show the same morphological changes in both cases, and furthermore old strains lose the capacity both of infecting Glossina and of developing in the culture tube.

From this it might be conjectured that trypanosomes growing well in culture would also be adapted for life in the gut of Glossina and that with cultures a higher percentage of Glossina infection would be obtained than with trypanosomes from the blood of a vertebrate.

Reichenow has investigated this problem: in his experiments he tried to infect *G. morsitans* with cultures of a strain of *T. gambiense* (As) and two strains of *T. congolense* (alt and B₁) and also with three strains of *T. gambiense* (As, D and G) maintained in laboratory animals. The flies were fed on the cultures by the usual method of inducing them to suck the material through a membrane of rats' skin.

Details of the experiments are given in full. On 12th October 1937 23 flies were fed on a culture of *T. gambiense* As. The culture was in the 32nd generation and was 15 months old. In all 25 flies were examined—1 on 15th October 1937 and 8 on 18th October 1937 all showed an infection of the mid-gut and the parasites appeared to be in a state of multiplication. 2 flies examined on 19th October 1937 were negative: the remaining 16 flies examined between 30th October and 5th December 1937 were all negative: guinea-pigs on which the flies were fed did not become infected.

An experiment with *T. gambiense* As maintained in guinea-pigs was performed with 57 flies: the results showed that the trypanosomes were capable of developing in the gut of the fly but had lost the capacity of developing in the salivary glands.

Strain *T. gambiense* D isolated from man 2 months previously and maintained in guinea-pigs, completed its development in the fly. Strain *T. gambiense* G isolated from man 6 years and 2 months previously and which had been shown to have become incapable of culture was tested by feeding 9 flies on an infected rat: so far as could be judged from this very limited experiment the parasites seemed to have lost their capacity of developing in Glossina.

Two experiments were performed in cultures of *T. congolense* strains. The culture of the first strain, *T. congolense* alt, was in its 86th generation and was 3½ years old: it had been maintained in laboratory animals for 9 years when the culture was started. In only 1 of the 25 flies used was a permanent infection of the gut found on the 42nd day of the experiment: no proboscis infections were discovered and guinea-pigs upon which they were fed remained negative.

The culture of the second strain *T. congolense* B₁ was in its 25th generation and was 1 year old: it had been maintained in laboratory animals 6 years when the culture was started. Of the 24 flies used 3 had a permanent gut infection and 2 had also a hypopharynx infection: the guinea-pigs on which the flies were fed remained negative however.

From this work the author concludes that cultures of trypanosomes are capable of undergoing incipient development in *Glossina* in approximately 100 per cent of cases but permanent infection of *Glossina* is not more easily obtained with cultures than with blood forms nevertheless under certain circumstances cultural forms may undergo complete development in *Glossina* H Y

NASH (T A M) The Ecology of the Puparium of *Glossina* in Northern Nigeria—*Bull Entom Res* 1939 July Vol 30 Pt 2 pp 259-284 With 6 figs. & 3 plates

Although much study has been devoted to the seasonal fluctuations in the size of adult tsetse populations in relation to climate no similar study has been made upon the pupal density and mortality in relation to the microclimatic conditions in the breeding-grounds. The present paper is concerned with such a study. The basic data were collected from the plain of the Katagum River near Gadam in Northern Nigeria where only *Glossina morsitans* and *G. tachinoides* occur

The author gives the following summary of his interesting work. —

1 The female tsetse extrudes her larva on soils ranging from fairly heavy clay to coarse sand the presence or absence of organic matter seems to be immaterial

2. The soil temperature varies greatly in different breeding-grounds in the dry season but little in the rains

3 The soil water content varies greatly in different breeding grounds in the rains but little in the dry season

4 The soil water content in some of the breeding-grounds falls so low in the dry season that there can be no doubt that the atmosphere in these soils is below saturation

5 Evaporation measured at 5 inches above ground level varies little from site to site bigger and important differences occur at greater heights above the ground where the screening effects of thicket become operative

6 The seasonal changes are so great at Gadam that no one breeding ground can satisfy the female's requirements throughout the year instead different breeding places are selected for different seasons

7 The cycle for *G. morsitans* is as follows. In the rains breeding occurs under palm fronds and logs in the open woodland. In the early dry season breeding continues in the open woodland but shifts from the palm and log sites to the small thickets breeding also starts in the more open parts of the forest islands. At the beginning of the very hot weather all the thickets of the open woodland are evacuated and breeding is confined to the densest parts of the forest islands. In the early rains the movement is reversed breeding shifts out into the open woodland and in the heavy rains is confined to the log and palm sites

This cycle fits in closely with the cycle for the seasonal concentration and dispersal of the adult population (Nash 1937 pp. 85-90)

8. The major wet season breeding ground of *G. tachinoides* is unknown but the cycle is believed to be as follows. In the early dry season breeding shifts from the log palm and probably from the unknown site to the small thickets and forest islands and becomes maximal in the cold season. Breeding now decreases in all sites suggesting that none is really suitable—a surmise which is strengthened when tremendous breeding activity starts in the river bed as soon as it becomes available at the beginning of the hot season. In the early rains this site is destroyed and breeding is believed to commence in the unknown site as it certainly does under the logs and palms

9 It seems that in very wet years *G. morsitans* and probably *G. tachinoides* stop breeding for a month towards the end of the heavy

ains an almost saturated atmosphere may be the cause. A similar phenomenon was recorded in Tanganyika (Nash 1933 pp 190-191)

10 After a wet season of low rainfall, when there has been no cessation of breeding the pupal density of the dry season is much greater

" 11 *G. morsitans* is considered to be a hardier species than *G. tachinoides* and to be better adapted to its environment.

" 12 Broadly speaking pupal mortality is high throughout the dry season and low throughout the wet, but the cycle is as follows. Immediately after the rains the soil is damp and not too hot and very few puparia die though the percentage mortality may be increased by the inclusion of dead puparia from the end of the rains. Mortality continues low throughout the early dry season, except under logs and palms which are becoming too hot. In the cold season mortality is everywhere higher perhaps because the prolongation of the pupal period in an unsaturated atmosphere leads to abnormal loss in weight, which may prove fatal. In the hot season pupal mortality is high for *G. morsitans* because of the high soil temperatures in its breeding-grounds, but low for *G. tachinoides* which mainly uses the river bed site

At the commencement of the rains the river-bed site is destroyed by flood and all the *tachinoides* puparia are killed. Elsewhere pupal mortality decreases as the soil becomes cooler and damper. Puparia continue very healthy until the soil water content becomes maximal in the last month of the rains, when mortality either rises or breeding ceases altogether depending upon the heaviness of the rains.

" 13 In the hot months of the dry season breeding shifts to cooler sites when the soil temperature becomes too high. Pupal mortality is greatest in the hottest sites and least in the coolest.

" 14 In the wet season breeding shifts to drier sites when the soil water content becomes too high. Pupal mortality is lowest in the driest sites and highest in the wettest.

15 Very high mortality percentages occur in the field only when pupal density is very low because the evacuation of the breeding-ground is almost complete before the sharp rise in mortality occurs.

" 16 It would appear from rather scanty data that mean maximum soil temperatures between 80° and 86°F are associated with high pupal mortality and that at higher mean maximum temperatures no puparia are to be found.

17 Soil water contents between 10 and 15 per cent. appear to be associated with very healthy puparia, whilst with 20-35 per cent. water contents pupal mortality is very high, and at water contents above 35 per cent. no puparia can be found.

18 Pupal mortality appears to be related to the absolute not to the relative, water content.

" 19 Among the dead puparia the proportion which die late in life is much greater in the rains than in the dry season. The difference is accentuated in very wet years.

" 20 In dry earth pupal mortality will only be affected by the soil water content if it falls below the figure at which the soil atmosphere ceases to be saturated (Buxton, 1936). The figure will vary according to the nature of the soil, but even in the heavy loams of the forest islands it will have to fall below 5 per cent. before there is any possibility of the atmosphere ceasing to be saturated and still lower in sander soils.

21 The pupal period may vary greatly in different breeding-grounds in the same month, because water content and consequent evaporation has so pronounced an effect on the temperature of the superficial layers of the soil.

" 22 The short duration of the pupal period in the early rains, coupled with a very low pupal mortality and an equable climate for the emerging offspring, must make this a particularly favourable season for the rapid increase in the size of the population "

WILSON (S G) A Note on the Fly Areas of North Nyasa District.—
Bull Entom Res 1939 July Vol. 30 Pt 2. pp 255-258
 With 2 figs. (maps)

This note on the distribution of tsetse in north Nyasaland is merely of local interest II 1

KUNERT (H) Veränderungen im klinischen Bild der ostafrikanischen Schlafkrankheit. [Changes in the Clinical Picture of East African Sleeplog Sickness].—*Arch f Schiffs u Trop Hyg* 1939 May Vol 43 No 5 pp 205-209 With 1 fig

The author records observations made by him at Tabora in 1929-30 and again in 1938 which suggests to his mind that the virulence of sleeping sickness in that district has changed.

He records that the Tabora epidemic commenced in 1927-28 KLEINE MACLEAN CORSON KEEVILL and others have drawn attention to the rapid course of the disease and the relative virulence of the parasite. Kunert who was in the Tabora district in 1927-28 had the opportunity of seeing and treating many cases. He was impressed by the quick development of the infection the trypanosomes rapidly spreading from the blood into the lymphatic glands and cerebrospinal fluid Enlarged cervical glands were regularly found but a positive finding (presence of trypanosomes or increased cell count) in the cerebrospinal fluid was extremely rare before the third week and similarly clinical evidence of disturbance of the central nervous system was likewise rare at the beginning of the disease

Certain details are given of 6 cases seen by the author in 1927-1928 These are considered as typical of the great majority of cases encountered at that time. Examples of the information given are —

1 Mudula ♂ 40 years ill two weeks glands cervical +++ axillary +++ blood + cerebrospinal fluid nil abnormal central nervous system, nil abnormal

5 Kamsini ♂ 50 years ill 3 weeks glands cervical ++ axillary ++ epitrochlear +++ blood + cerebrospinal fluid 80 cells central nervous system reflexes increased

When the author returned to Tabora in 1938, he found that certain changes had occurred in the clinical picture. The vast majority of the cases failed to show enlarged lymphatic glands A positive cerebrospinal fluid finding was often obtained even during the first few days of the illness and clinical signs of disturbances in the central nervous system were seen very early Details are given of 6 cases considered by the author to be a fair sample of the lot Examples are —

1 Asumani. ♀ 20 years ill 10 days glands nil blood scanty trypanosomes cerebrospinal fluid 20 cells trypanosomes present central nervous system nil abnormal.

5 Hassani. ♂ 50 years ill 18 days glands nil blood + cerebrospinal fluid 206 cells trypanosomes present central nervous system, all reflexes increased

The author considers the more rapid appearance of trypanosomes in the cerebrospinal fluid as evidence of increase in virulence of the parasite and the earlier increase in cell count is evidence of the same thing He finds further support for this hypothesis in the absence of enlarged glands the parasites passing through the lymphatic filter

IV Y

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W Y

LE GAC (P) & SERVANT (J) Etude de la résistance globulaire au cours de la trypanosomiase humaine. [The Red Cell Resistance in Human Trypanosomiasis.]—*Bull Soc Path Exot* 1939 May 10 Vol. 32 No. 5 pp 492-498 With 2 figs

The resistance of the red cells to saline was examined in 70 cases of sleeping sickness the technique used was that of VAQUEZ and RIBIERRE. The results are shown in two tables the first dealing with cases in the first stage of the disease and the second with those in the second stage. In 37 cases (52.8 per cent) haemolysis commenced at salt concentrations of 0.45 to 0.40 per cent which is within normal limits. In 28 cases (40.0 per cent) the resistance was increased somewhat but the haemolytic point was never less than 0.30 per cent. In 5 cases (7.2 per cent) the resistance was slightly diminished in that haemolysis was noted with a salt concentration of 0.50 per cent. IV Y

PINARD (Marcel) & BRUMPT (L. C.) Considérations sur un cas de maladie du sommeil observé en France [A Case of Sleeping Sickness observed in France.]—*Rev Méd et Hyg Trop* 1939 Mar-Apr Vol. 31 No. 2 pp 33-36

The patient—an African cook, aged 32—came to hospital complaining of a generalized pruritus and epileptic crises of 6 months duration. A diagnosis of nervous syphilis was made and lumbar puncture seemed to confirm it. The Wassermann reaction was positive as was also the colloidal benzoin reaction [see this *Bulletin* 1939 Vol. 36 p 253] the protein was greatly increased (1.1 gm. per litre) and the cell count was 1,800 per cmm. The patient was then sent to the malaria therapy centre. Here the facts that the patient was an African and that there was no Argyll Robertson pupil nor sign of paralytic dementia made the authors consider the possibility of cysticercosis or trypanosomiasis. There were some palpable cervical glands.

Interrogation revealed that the patient was born in the Loango district of Moyen-Congo in 1907. At first he was a porter but at the age of 15 he became engaged as a cook on a ship plying from West Africa to Bordeaux. At 17 he was stationed at this place where he lived until 3½ years ago when he left for Paris. According to this history the patient had not been in a Glossina country for 15 years.

Further examination of the spinal fluid confirmed the previous findings, with the addition that a few trypanosomes were found in the centrifuged deposit. Examinations of the blood and bone marrow were negative, and the glands were too small to be puncturable.

The main point of interest in the case is the remarkably long latent period in fact it was so long that the authors speculate whether the infection could not have been contracted in some other way than through Glossina. IV Y

SICÉ (A.) ROBIN (Ch.) & ORRILLÉ (G.) L'irritation pallidale et ses réactions dans la méningo-encéphalite trypanosomique [Pallidal Irritation and Its Reactions in Meningo-Encephalitis Trypanosomiasis.]—*Bull Soc Path. Exot* 1939 June 14 Vol. 32 No. 6 pp. 649-654

Clinical details are given of two cases of sleeping sickness encountered by the authors in French Sudan, both of which showed

signs of chronic meningo-encephalitis. In the first of these cases trypanosomes were found in the cerebrospinal fluid but in the second all attempts to discover the parasites failed both patients died. The interesting point is that they exhibited signs of Parkinsonism.

The authors point out that until recently natives presenting the Parkinsonian syndrome have hardly been met with in the endemic sleeping sickness areas. But of late they have found in villages of French Sudan a number of cases—men and women for the most part young—of post-encephalitic Parkinsonism.

There is no doubt that African sleeping sickness does not give rise to the profound changes in the nervous system produced by other infections and particularly by encephalitis. Henceforth it will be necessary to bear in mind the possibility of post-encephalitic symptoms in sleeping sickness work in Africa and especially in such cases as the second of the authors' patients in whom all attempts to discover the trypanosome failed. 11]

BOURNELL (John Colin) & WORMALD (Arthur) Studies on Bayer 205 (Germanin) and Antrypol IV The Retention of the Drug in the Animal Body—*Biochem J* 1939 Aug Vol 33 No 8 pp 1191-1200 With 1 fig [21 refs]

In previous papers a method for the determination of Bayer 205 was described and observations were made on the persistence of this drug in the blood stream after injection into animals [this *Bulletin* 1938 Vol 35 p 714 and 1939 Vol 36 p 668]. The experiments recorded here have been carried out to determine (a) whether there is any appreciable storage of the drug in the liver kidney and other organs and tissues and (b) whether persistence in the blood stream is due to combination of the drug with plasma proteins.

The authors summarize their work as follows—

1 Investigations have been made to determine the cause of the long retention of Bayer 205 (or Antrypol) in the animal body after injection of the drug. In particular the possibilities of (a) storage in certain organs and (b) combination with plasma and tissue proteins have been studied.

2. There is no marked storage of the drug in the liver heart muscle lung brain adrenals or pancreas of rabbits which have received one, two or three injections of Antrypol. Each of these organs except the brain retains a small but measurable amount of the drug possibly in combination with the tissue proteins.

3 The kidneys of these injected rabbits contain considerably more Antrypol than do the other tissues examined and the amount present (in terms of mg drug/g kidney) varies appreciably from one animal to another. This retention of the drug in the kidney is of special significance in view of the fairly frequent occurrence of albuminuria following the injection of the drug into man.

4 The spleen contains a little more of the drug than do the other organs examined but considerably less than the kidney. Slight retention in the spleen might possibly be due to association of the drug with the reticulo-endothelial system.

5 Various protein fractions have been separated from the serum and plasma of injected rabbits and from normal serum to which Bayer 205 has been added. Evidence has been obtained that plasma globulin and probably other proteins can combine (by adsorption or otherwise) with this drug.

6 The conclusion is reached that the long retention of Bayer 205 in the animal body is due to the combination of the drug with plasma and tissue proteins.

W 1

PEARCE (LORNE) Trypanamide in the Control of African Sleeping Sickness.—*Science* 1939 July 14 N.S. Vol. 90 No. 2324 pp. 39-40

A semi-popular article indicating that the outlook for satisfactory control of African sleeping sickness is now much more promising than formerly and that this encouraging situation is directly associate with the introduction of trypanamide therapy

W 1

JAWS AND SYPHILIS.

PRELIM OF ABSTRACTS IN THIS SECTION

SMIRNOV (p. 21) describes jaws in a tribe in the Cameroons. Crab jaws, scapula, eye lesions and gangosa were not seen, and mucous membranes were rarely affected. Natives recognize that jaws is an old-standing disease and that syphilis is a recent introduction. DAVID (p. 22) found that only one of 28 patients with uncomplicated jaws gave a positive Kahn reaction. DEXTER (p. 22) shows that three injections of N.A.B. are insufficient to cure jaws.

SICK *et al.* (p. 22) describe three cases of gangosa. LENTZ and SERRA (p. 23) reports two cases of juxta-articular nodes in a native of the Congo. FENNER (p. 23) reports two cases of juxta-articular nodes in Australia, one in a native who had suffered from trinitia and one in a Scotswoman with a history of syphilis. DE OLIVEIRA (p. 23) also describes a patient with juxta-articular nodes but was unable to decide whether they resulted from jaws or syphilis.

The jaws-syphilis controversy is discussed by a number of authors. HASSELMAN (p. 24) in experimental work on monkeys found that whereas *Sp. perennis* cannot live except in ectodermal tissues, *Sp. pallida* is panbiotrophic. The secondary lesions in jaws resemble the primary, but in syphilis this is not so. The primary lesions in injected *M. cynomolgus* are distinguishable from those producing a traumatic papilloma and syphilis a sclerotic lesion. In gangosa the jaws spread from the deep to the superficial parts. RAJAM (p. 25) reports a case in which jaws of long standing failed to protect against syphilitic infection. TOWN (p. 25) recognized syphilitic rupture in a child in Nigeria thought to be suffering from jaws and found a hard chancre on the genitalia, probably originating from syphilitic infection during circumcision.

SLANET SUBIRYO (p. 25) found changes in the cerebrospinal fluid only in the secondary stage of jaws and concludes that lesions of the central nervous system comparable with tabes and general paralysis do not occur. On the other hand BOTTEAU-ROUSSEL (p. 26) diagnosed tabo-paresis in a native of the Ivory Coast and considers it to have been due to jaws (but the evidence appears to be very incomplete).

ISWARIAH and NAIR (p 26) describe an epidemic of an infection with a spirochaete indistinguishable from *Sp pallida* and characterized by sores at the angles of the mouth with adenopathy in women and girls in India. The Wassermann was positive and the authors discuss the nature of the disease pointing out the similarity to bejel.

C IV

SCOTT (C J) Yaws a Further Report on the Robinson Deep Occurrence.—*Proc Transvaal Mine Med Officers Assoc* 1939 Apr Vol. 18 No 206 pp 151-155 With 4 figs

In this *Bulletin* 1933 Vol 30 p 595 an article embodying some particularly interesting observations by Dr C. J. Scott upon yaws as it occurred among workers in a Johannesburg mine was reviewed.

The article now presented is prefaced by a note. This report obviously written for submission to the Transvaal Mine Medical Officers Association was found amongst the papers of the late Dr Scott. The paper however contains little that is new beyond a statement of the number of cases of yaws occurring in the years 1934-1937.

H S Slannius

SIMPSON (T) Yaws and its Treatment in the Bamenda Division of the Cameroons under British Mandate —*West African Med J* 1938. Oct Vol 10 No 1 pp 14-34 With 39 figs on 8 plates

A long paper giving an excellent description of yaws in the northern province of the Cameroons with a number of very good photographs. There is nothing new in the observations made but they serve to confirm previous views on yaws.

Of 30 000 cases of yaws in the province clinical studies were made upon 920 all of the Wom tribe among whom the disease occurs in 100 per cent. Among these people of whom the men only wear a strip of cloth over the pudenda and the women and children nothing one of the commonest sites for the primary lesion is on the genito-perineo-natal area and inner side of thigh these sites being very rare among the clothed tribes of S. Nigeria. These are sites of common skin infections in the unclothed causing scratching thus confirming liability to-trauma as a potent site factor.

Crab yaws was never seen no case of sabre tibia was encountered. No eye lesions occurred but 4 cases of J.A.N. and 1 of goundou (she stated that she had never had yaws) were noted also 21 cases of ganglion of the flexor and extensor tendons of the wrist and forearm. No case of gangosa was met with among the 920 Wom people but 55 cases from adjoining areas all except three with a history of yaws were observed. Syphilis could not be excluded in these cases.

The mucous membranes are rarely affected the author states the primary yaw if situated on the labia may extend into the vaginal mucous membrane just as a lesion on the lip or about the nostril may extend across the mucocutaneous border. Among 725 cases in which routine examination of mucous membranes was made 23 in the late secondary stage showed whitish patches on the tonsils, soft palate uvula, or posterior pharyngeal wall replaced later by pale bluish ulcer patch. The part played by the soil rainfall humidity and vegetation is in conformity with previous observations.

There was a seasonal increase in the number of cases with the rains and flies (muscads) might play a part in transmission.

While the author hesitates to make up his mind concerning the relationship of yaws and syphilis, his trained native assistants state that while yaws is as old as the hills so to speak, syphilis is of recent introduction in neighbouring areas that the two diseases are quite distinct and should never be mistaken

H S S

DAVID Note sur la réaction de Kahn dans le pian et la malaria. [The Kahn Reaction in Yaws and Malaria].—*Bull Mtd du Katanga* 1938 Vol 15 No 1 pp 7-9 [Summary appears also in *Bulletin of Hygiene*]

The author had in mind the discovery of cases of inapparent syphilis among women living in the rural parts [of Katanga]. Finding that a considerable number of them gave a positive Kahn reaction he examined cases of yaws and of subtertian malaria to determine whether some at least of the reactors might be suffering from these and not from syphilis. The numbers of yaws cases (27) and of malaria (6) are too few for valid induction but may be of some interest. Of the yaws patients six were in the primary, two in the secondary and 19 in later stages. Two gave a positive reaction—one a man of 25 years with primary yaws. He had no brothers or sisters, and his parents were dead—he himself showed no signs of either congenital or acquired syphilis. The second was a woman of 35 years with a painless ulcer in the sole—she had had two miscarriages. Subsequent questions revealed that she had had syphilis. With one exception therefore among those examined, uncomplicated yaws did not give a positive Kahn reaction. All six malaria patients proved negative

H H S

DEMPTSTER (G) Treatment of Yaws studied Serologically.—*New Zealand Med J* 1938 Dec Vol 37 No 202 pp. 338-342.

A short article reporting the results of serological tests (Kahn) in some two dozen cases of yaws at different stages, drawn from the Yaws Clinic, Apia, Samoa in 1936-37.

The evidence from such a small series of itself would be of little value but it goes to confirm the findings of others, namely that the common method of treatment by means of a course of three injections of N.A.B. is wholly insufficient to cure. Little effect is produced on serological reactions, recurrences are frequent and treatment more difficult in relapse

H S S

SIXE (A) FOLDEVIGX (H) & BERTSON (H) Contribution à l'étude pathogénique de la rhino-pharyngite ulcéreuse et mutilante (gangosa). [On the Pathogeny of Gangosa].—*Bull Soc Path Exot* 1939 July 12 Vol 32 No 7 pp 716-720. With 2 figs

Observations upon three cases of gangosa, two in natives of the southern zone of French Sudan near the border of the Ivory Coast, and one of French Guiana. In all three—one a woman of 29 years, another an infant of 18 months, the third an adult male—the process began as a lesion situated at the posterior border of the anterior naris.

In two cases secondary framboesial lesions were present on the body in the case of the woman there was a history of past yaws

The authors appear to believe that any lesion in this position framboesial or otherwise may ulcerate and become phagedaenic with the production of gangosa Treatment by means of bismuth and arsenic given to the woman was followed by excellent result

H S S

LENTI (Pietro) & SERRA (Giovanni) Lesioni terziarie da Spirocheta pertenuis nodositas juxta-articularis. [Juxta-articular Nodules in Tertiary Yaws.]—*Arch Ital Sci Med Colon e Parassit* 1939 May Vol 20 No 5 pp 273-297 With 12 figs

The authors describe fully a single case of J.A.N. seen by one of them in the Belgian Congo—a native male aged 50 with a history of yaws at seven years of age which lasted eighteen months followed by two years of fever and periarticular pain The nodes appeared at the age of thirty and took ten years to reach their size when seen they were typical of their kind The W.R. was positive The nodules were easily shelled out Histologically they did not differ from those found in other cases

The rest of this rather long article consists of a summary of the findings of some other observers all of which have been dealt with in this *Bulletin*

H S S

FRANER (Frank J.) The Occurrence of Juxta-articular Nodules in Australia.—*Med Jl Australia* 1938 Sept 10 25th Year Vol 2 No 11 pp 412-417 With 4 figs. (2 on a plate) [34 refs.]

The author writing from the University of Adelaide describes two cases of J.A.N.—which he believes to be the first reported from Australia One was a male native aged 65 who had signs of having suffered from irikintja the disease which has been identified with yaws

The second was a 53-year-old Scotswoman who had never resided in the tropics but had lived in Australia 25 years there was a history of syphilis in the husband The cases were typical with multiple nodules and positive W.R. in each. In the woman however some of them broke down. The pathological picture obtained by sectioning excised nodules was also typical In the woman the nodules almost entirely disappeared under antisyphilitic treatment

The rest of the article consists of a summary upon the subject of J.A.N. largely extracted from this *Bulletin*

H S S

DE OLIVEIRA (Paulo) Nodosidades juxta articulares de Lutz Jeanselme. [Juxta-articular Nodules.]—*Brasil Medico* 1938 Oct 15 Vol 52 No 42 pp 943-947 With 6 figs. [14 refs.] English summary (9 lines)

The fact is well known that the serum of patients with juxta articular nodules gives a positive Wassermann reaction hence the belief that these are syphilitic in origin The present case is an instance of the difficulty of deciding whether these nodules are a sequela of yaws or are a syphilitic manifestation The patient was a man of 35 years

who could not say whether or not he had suffered from yaws. He had certainly had several attacks of venereal disease, gonorrhoea and three times a chancre for one of which he received a course of mercury injections. He presented twelve nodules on hands, elbow and feet. Wassermann and Kahn reactions were both positive with his serum negative with the spinal fluid. Clinical cure was obtained with neosalvarsan and bismuth.

H H S

HASELMAHN (C. M.) Zur Klinik Symptommatologie und Leimologie von Framboesie und Syphilis. [The Clinical Features, Symptomatology and Pathology of Yaws and Syphilis].—Reprinted from *Berichte d. Phys Med Gesellschaft z Würzburg* N F 1937 Vol 81 pp 51-69 With 14 figs.

This appears to have been delivered as a lecture accompanied by illustrative photographs, several of which have been reproduced and certainly demonstrate various framboesial conditions very clearly. The author defines leimologie as "epidemiology and endermology" but it covers, in this case, more than these—it goes into the question of the pathological differences between yaws and syphilis.

He reviews his experiences and his experimental work carried out in collaboration with SCHÖNKE on *Mycobacterium cynomolgus*. He shows that virulent *Sp. pertenuis* may be found, caught up in the lymph glands regional to the primary lesion and that when the latter has healed, living spirochaetes are no longer to be found and they can neither increase nor live in the mesodermal lymphatic gland tissue—in other words the *Sp. pertenuis* is ectodermotropic. *Sp. pallida* on the other hand attacks all three embryonal layers—it is panblastotropic. In a little more detail, in yaws the inflamed tissues are increased, vascular but there is never any marked affection of the intima or media, thence no proliferation of these leading to obliteration and so to necrosis. In syphilis on the other hand such changes do occur leading to the production of a hard chancre. If untreated the yaws in 10-12 weeks gives rise to generalised, metastatic papillomata each showing the same changes as the primary focus, in contrast with secondary syphilomata which are not "generalised chancres. Later still, the efflorescent patches of yaws ulcerate or harden to a keratoderma of palm or sole—a hyperkeratosis. The presence of secondaries all resembling the primary lesion, and occurring simultaneously is practically diagnostic of yaws but he maintains, injection of *M. cynomolgus* will settle the question of diagnosis for in yaws, the initial lesion will be a typical framboesial papilloma, in syphilis an indurated, sclerotic lesion.

Again, gangosa and syphilitic perforation may resemble one another but the history will reveal that the syphilitic process spread from the deeper parts to the superficial, whereas in yaws it arose from the surface and spread to the deeper parts—the necrotic process extended from the cutaneous layer. Other points are mentioned such as that transplacental infection in yaws is unknown and hence congenital yaws has not been recorded. He shows a good photograph of juxta-articular nodules of the malleoli and he thinks that juxta-tendineal is a more correct term. Even if little that is new is added, the article is an excellent summary of Dr Haselmann's views.

H H S

RAJAN (R. V.) Report of a Case of Early Acquired Syphilis in a Patient with Tertiary Stigmata of Untreated Yaws—*Indian Med Gaz* 1938, Dec. Vol 73 No 12, pp 735-736 With 1 text fig [Summary appears also in *Bulletin of Hygiene*]

The patient was a man of 39 years with the following history. He came from Cochin State where yaws is endemic. At the age of 10 years he developed an indolent sore at the back of his neck and for the next 8 years suffered from multiple recurrent sores which were not treated and had left puckered thickened scars on arms shoulders buttocks legs and feet and he was very crippled.

Two and a half months before he came under the author's observation he had exposed himself to the risk of venereal infection and a penile sore developed fifteen days later followed in 8 weeks by a papular syphilide. There were no indications of congenital syphilis. The Kahn and Wassermann reactions with his serum were positive and the *Sp. pallida* was seen by dark ground examination of fluid from the chancre. The sore and the rash cleared rapidly when antisyphilitic treatment was instituted. Clearly the long-standing yaws had failed to confer any immunity against the subsequent syphilis [see also CHAMBERS H. D. this *Bulletin* 1937 Vol 34 p. 959] H. H. S.

- i. TODD (K. W.) Yaws and Syphilis. Genital Chancre in a Boy of 6 Weeks. [Memoranda.]—*Brit Med J* 1939 Apr 22, p 827
- ii. BLACKLOCK (D. B.) Yaws and Syphilis. [Correspondence]—*Ibid* May 13 pp 1004-1005

i. The author's suspicions in the case of a Nigerian boy 6 weeks old thought to be suffering from yaws were aroused by the fact that scabs had fallen off and left dry depressed beds which reminded him of rupia and that scabs still present were not piled so high as usual in yaws. There was a hard chancre with a rolled edge on the genitalia which probably originated from circumcision performed by a native in the course of which the child was infected. This recognition of rupia is an argument against the identity of yaws and syphilis.

Referring to the fact that congenital yaws is not found, the author quotes two cases of florid yaws existing in women at the time of confinement. The children remained perfectly healthy but unfortunately blood for serum was refused. Florid yaws may not be so rare in pregnant women as is thought.

ii. In a comment Blacklock points out that the rupia of syphilis is a late secondary manifestation and that assuming the eruption in TODD's case to be rupia the extreme precocity of its incidence makes it quite unlike the rupia which syphilologists in Europe, America and this country [Britain] describe as syphilitic. C. H.

SLAMET SUDIBYO (R. M.) Vergleichend onderzoek van de liquores bij framboesia tropica en syphilis [Comparative Investigation of the Cerebrospinal Fluid in Yaws and Syphilis.]—*Geneesk Tijdschr v Nederl Indië* 1939 Jan 31 Vol 79 No 5 pp. 284-305 [15 refs.] English summary [Summary appears also in *Bulletin of Hygiene*]

1. The still existing difference of opinion about the frequency in yaws of lesions of the central nervous system resembling tabes dorsalis or general paralysis leads me to re-investigate this problem.

between sprue and pellagra. The administration of nicotinic acid to two women with idiopathic steatorrhoea caused improvement in the diarrhoea but not in the other symptoms when used by BING and BROAGER (p 33). FUCHS and WISSELMACK (p 33) successfully treated a patient with nicotinic acid but analysis of the symptoms points to a diagnosis of pellagra and not as the authors claim, to sprue.

In discussing four cases of steatorrhoea BRULL *et al* (p 34) conclude that the condition is due to multiple avitaminosis associated with reduction of the digestive secretions. In comment SCOTT points out the present unsatisfactory nomenclature of this and similar conditions.

HOLMES (p 35) describes chronic diarrhoea associated with osteomalacia. Against the diagnosis of sprue was the absence of anaemia and steatorrhoea. FROSTAD (p 35) and BURGDORF and BARRY (p 35) describe cases of steatorrhoea. C IV

FOURCRAIGS. La sprue. [Sprue].—*Les Grandes Endémies Tropicales*. 1938. Vol 10 pp 53-75

Sprue would naturally be expected to bulk largely in a work on tropical endemic diseases. In the section dealing with this subject a great opportunity has been allowed to slip. In a French work one admits that ample justice should be done to French workers, but science is international and British investigators have done as much as any and more than most to throw light on this obscure subject. In the present article however they are almost completely ignored and no mention is made of their studies in the past decade or so and consequently the author has dealt chiefly with old theories and the article becomes one of historical interest mainly, if not entirely.

H R S

BOMBAY. REPORT OF THE HAFKINE INSTITUTE FOR THE YEAR 1938 [SOMKEY (S S) Director].—A New Group of Bacilli associated with Sprue and Pernicious Anaemia [GORE] p 53

The author tells of certain haemolytic bacteria which he has found, it would appear to be in the intestinal contents in cases of sprue and pernicious anaemia. Although he finds the organism in cases of sprue the author does not commit himself to the opinion that it is causative but, at the same time, used the fact as a diagnostic aid. He suggests that the disease is primarily the result of dietary deficiency which brings about changes which in turn promote or at least permit the survival of this organism. It is common in water and sewage. Beyond stating that the organism, or group of organisms is haemolytic and produces H_2S in litmus milk culture its characters are not described in this report.

H H S

SUÁREZ (Ramon M). Clinical and Hematological Review of Sprue based on the Study of 150 Cases.—*Puerto Rico J of Public Health & Trop Med* 1938 Dec Vol 14 No 2 pp 157-175 With 2 figs. [18 refs.] [Spanish version pp 176-187]

In a review one does not look for—it would be wrong for one to expect—anything new and readers bearing this in mind will find much of interest in this article. Again, a critical review naturally bears the impress of the reviewer's predilections. In stating that

authenticated cases of sprue have been reported from temperate climates developing in individuals who had never visited the tropics

the disease formerly regarded as tropical has become cosmopolitan. Dr Soárez seems to take for granted that the so-called idiopathic steatorrhoea of non tropical countries and tropical sprue are one and the same a proposition which has many opponents. Again it is strange that among 150 cases of tropical sprue though many complained of cramps none showed signs of typical tetany either spontaneous or induced. [In the abstractor's case if a personal reference may be pardoned though cramps were common and painful, true tetany proved for a time very troublesome occasionally attacks occurred spontaneously but during a period of months could be induced in the hands by attempting to write a note.] As regards the hereditary factor in which the author believes, many cases occur in persons whose parents have never been to the tropics or who if they have have not suffered from pernicious anaemia or sprue. Heredity cannot play any large part.

The author shows that the diet of the Porto-Rican is much deficient in Vitamin A and low also in calcium phosphorus and fat and mentions that some cases benefit when vitamin B is administered. The haematological studies have proved of little value for the limits at all events in these 150 cases are too elastic. Thus the erythrocytes ranged between 690 000 and 4 410 000 per cmm. haemoglobin between 2.4 and 14.8 gm. or 16.5 and 102 per cent the colour index between 0.6 and 2.2, leucocytes between 1,550 and 19 600 per cmm. [it is not said whether there was any complication to account for this leucocytosis]. The results of examination of the sternal marrow are interesting and the author sums up well the rationale of present-day treatment.

H H S

BAUER (Julius) Endocrine Aspects of Sprue their Relation to the Pituitary Syndrome in Anorexia Nervosa.—*Jl Trop Med & Hyg* 1939 Aug 15 Vol 42. No 16 pp 245-250 With 3 figs. [25 refs.]

The author is in agreement with THAYSEN in regarding tropical sprue idiopathic steatorrhoea coeliac disease as all one and the same this is stated as a fact and is not discussed. He goes on to record a case in which certain symptoms—which are also found in some sprue patients—are indicative of endocrine disturbance. The patient was a woman of 52 years admitted into the Charity Hospital Louisiana New Orleans, complaining of diarrhoea weakness shortness of breath, nausea, sore tongue and mouth and occasional dizziness and cramping pains in legs and arms. Blood calcium was 6 mgm per cent. She improved on treatment with liver extract high vitamin diet and vitamins A B₁ B₂ and C in tablets and left hospital in 15 days having gained 19 lb. in weight. The author compares the signs present in his patient with those observed in cases of impairment of function of the anterior lobe of the pituitary—in particular a tendency to secondary hypoglycaemia and excessive response to a small dose of insulin—which occur in some cases of idiopathic steatorrhoea. He comments on the absence of tetany in his patient in spite of the low calcium content of the blood, stating that it is not the lack of calcium in the blood, but apparently the lack of calcium in certain parts of the central nervous system which is responsible for the symptoms of

tetany but it is to be noticed that the patient did complain of cramping pains in legs and arms. [It is to be noted that the author lays stress on the *functional* impairment of the anterior pituitary as SCOTT (to whom he refers) did as regards the parathyroids, though the latter has been constantly misrepresented and his views combated on the ground that microscopical examination in fatal cases reveals no structural changes.] H H S

MOHR (Werner) Symptomatische Sprue bei gastrokolischer Fistel. [Gastro-colic Fistula with Sprue-like Symptoms.]—*Dtsch Med Woch* 1939 Feb 24 Vol. 65 No. 8. pp 287-289 With 4 figs. [15 refs]

This is an important communication well described. Briefly stated the patient presented a condition bearing certain resemblances to sprue—foamy diarrhoea, loss of weight, a flat sugar curve, a ratio of neutral fat to fatty acids in the stool of 1 to 3. There was, however, no glossitis or stomatitis, the anaemia was not great, 3.5 million red cells, haemoglobin 70 per cent., colour index 1, no macrocytosis mentioned. Operation revealed a fistulous communication between the stomach and the transverse colon, and when this was closed the symptoms began to clear.

There were many reasons in this case to support a diagnosis of sprue. The patient had lived abroad, in China and elsewhere, had suffered from dysentery—a frequent precursor of sprue—from other dietetic diseases, beriberi and scurvy and from liver abscess. [The author comments on the absence of osteoporosis as militating against the diagnosis of sprue, whereas its presence is more characteristic of idiopathic steatorrhoea.] H H S

PERDOMO HUXTADO (B) Sprue y anemia de tipo pernicioso consecutiva. [Sprue and Secondary Anaemia of the Pernicious Type.]—*Gac. Med de Caracas* 1938, Sept. 30 Vol. 45 No. 18. pp. 274-277

This is a general account of sprue illustrated by the case of a man 59 years of age who at intervals had presented symptoms for eleven years. Blood examination gave red cells 2,420,000 per cmm., haemoglobin 78 per cent., colour index 1.6. No mention is made of any anisocytosis, poikilocytosis, or erythroblasts and the "pernicious type" of anaemia was diagnosed on the high colour index. There is nothing special to record concerning this case—the treatment and its theory are discussed. H H S

SPRENG (A) Einheimische Sprue und Schwangerschaft. [Non-Tropical Sprue and Pregnancy.]—*Schweiz Med Woch* 1939 Feb 18 Vol. 69 No. 7 pp 150-151

A case of steatorrhoea in a patient already tuberculous. The blood showed a macrocytic anaemia, colour index 1.1 and calcium 7.2 mgm. per cent. The blood count is not stated nor any analysis of the stools, beyond the bare statement that fat was increased. The author speaks of osteoporosis being present but elsewhere says there was no doubt of the diagnosis of sprue, whereas in true sprue osteoporosis is not seen. The patient was delivered of triplets and after that

improved gradually but slowly [The case was very likely one of interference with absorption from abdominal pressure perhaps associated with enlarged glands (though this is not mentioned) for the patient was tuberculous and bronchiectatic] H H S

POCK STEEN (P H) Klinische observaties. I Het symptoom der vergeten ademhaling [Clinical Studies. I The Symptom of 'Forgetting to Breathe']—*Geneesk Tijdschr v Nederl Indië* 1939 Vol 79 pp 727-748 [Summary taken from *Nutrition Abstracts & Reviews* 1939 July Vol 9 No 1 p 166 Signed I LITCHE]

A syndrome is described in 57 cases characterised by slow respiration interrupted by deep sighs. Blood pressure was low red cell count high with normal or low Hb blood sugar low peripheral hyperirritability was always present almost all cases showed mydriasis photophobia and twilight blindness nervous symptoms in the form of anxiety and over-excitability were universal with increasing weakness and psychic disinclination for exertion severe cramps occurred. The faeces always showed a high fat content In some cases severe anginal pain occurred at times

The condition is considered to be one of tissue anoxaemia due to histamine toxicosis and to have many features in common with sprue. Exercise if persisted in gave relief lasting for days. Injection of liver extract with administration of Fe and vitamin C was beneficial in some cases. Injections of liver extract and lactoflavin or of cortin lactoflavin and ascorbic acid together gave relief in severe cases. Heart stimulants were without effect

TOULLEC (F) & RIOU (M) Le problème thérapeutique de la sprue [Sprue and its Treatment].—*Rev Méd Française d'Extrême Orient* 1938 Aug-Sept. Vol 20 No 7 pp 829-867

This is an excellent review of the subject to the present day and discusses treatment from the aspects of general régime of diet of vitamins of organotherapy and symptomatic and prophylactic treatment. No fresh research on the part of the authors is included names are quoted frequently in the text as authority for statements made but dates are not given and there is no bibliography so that it is almost impossible to look up the original papers from which quotations or opinions are stated. Those wishing to become *au courant* with the present state of this interesting problem would do well to read the article at length

[There are a few misprints one of the most unfortunate being Failey for the name of probably the soundest authority on the dietetics of sprue] H H S

ROGERS (Leonard) The Use of Proniosil in Sprue. [Memoranda].—*Brit Med J* 1938 Nov 5 pp 943-944

Though in dealing with a disease such as sprue which exhibits intervals of improvement varying in duration we must be cautious in interpreting *post hoc* as *propter hoc* when success follows a certain line of treatment the use of proniosil suggested by Sir Leonard Rogers has

a rational basis and is consequently worthy of further trial. Sir Leonard Rogers has for nearly a quarter of a century favoured a streptococcus as playing a part in the aetiology of the symptom-complex of sprue. From time to time since 1914 he has recorded patients benefiting from the use of autogenous streptococcal vaccines and in 1920 compared forty-four in Calcutta so treated with forty-five others in the Calcutta European hospital. Among the latter five only made a marked improvement whereas among the former twenty-one recovered (eighteen remained well for over a year) and thirteen others improved greatly. Since dietetic treatment was adopted at the same time it is not safe to ascribe too much to the vaccines, but the contrast is most suggestive.

The author now reports the case of a man over 80 years of age who has suffered for some years from sprue. Recently his condition became serious, accompanied by fever and some degree of bronchitis and a fall of haemoglobin to 48 per cent. stools numbered up to seven daily. He was given injections of liver extract and prontosil rubrum *per os*. The temperature dropped, stools diminished to two or three daily and the soreness of the mouth lessened. Again since liver extract was also given and, presumably, the diet was carefully regulated it is difficult to assess the part played by the prontosil, but in view of the former benefit from streptococcal vaccines and the knowledge that prontosil acts on streptococci its further trial is clearly called for. If it does no more than relieve the troublesome and exceedingly painful stomatitis and glossitis it will not be given in vain. H H S

JUSTIN BERANQON (L.) CAROLI (J.) & INBONA (J. M.) Action de l'acide nicotinique dans un cas de sprue. Étude clinique. [Nicotinic Acid in Sprue.]—*Bull. et Mém. Soc. Méd. Hôp. de Paris* 1939 July 17 65th Year 3rd Ser. No. 24 pp. 1135-1141.

A man 56 years old when seen by the authors in 1936 had lived in various warm countries, the Amazon, Netherlands Indies and Venezuela and returned to Europe in 1900. The following year in spite of there being no record of illness while he was abroad he developed symptoms typical of tropical sprue. He submitted to the usual forms of treatment—dietetic, vitamin D, iron and calcium gluconate, intra-venously, stovarsol, kaolin, bismuth and so forth—without benefit. In April 1937 he was given liver extract and improved considerably and left hospital, but in a little less than two years he was back again; the improvement lasted for 14 months. In March 1939 all the symptoms had returned; he was given nicotinamide 1 gm. thrice intra-muscularly from 29th March to 12th April—no benefit; then liver extract for 5 days and nicotinamide for another 8 days, and again 5 days with liver extract still without amelioration. On April 29th nicotinic acid was started by mouth 3 cachets daily each of 5 cgm. Improvement was obvious in 3 or 4 days, the stools were less bulky and changed in character; the patient increased in weight 2.6 kgm. in 10 days; on the 10th the dose was raised to 20 cgm. and on the 18th to 25 cgm. the last was never surpassed. The improvement has been maintained to the time of reporting (but the interval has not yet reached the length of that of improvement after taking liver in 1937. A further report will be awaited with interest). H H S

JUSTIN BESANÇON (L.), CAROLI (J.) & INBO A (J. M.) Le traitement nicotinique de la stéatorrhée idiopathique. Remarques biologiques et nosologiques. [Nicotinic Acid in Idiopathic Steatorrhoea.]—*Bull et Mém Soc Méd Hôpit de Paris* 1939 July 17 55th Year 3rd Ser No 24 pp 1141-1145

The authors after recalling two Danish cases treated with success by nicotinic acid mention another under their own observation. Details are not given but the resemblances between sprue and pellagra are pointed out—stomatitis glossitis pigmentation diarrhoea anaemia. They are of opinion that the nicotinic acid has not merely an effect on the water content of the stools but that it has an action direct or indirect on the metabolism of fats. H H S

BING (Jens) & BROAGER (Bendt) Investigations on the Effects of Nicotinic Acid on Two Patients with Idiopathic Steatorrhoea (Sprue).—*Acta Med Scandinavica* 1938 Vol 97 No 5-6 pp 561-577 With 3 figs. [54 refs.]

The success following the use of nicotinic acid in pellagra was certain to lead to trial of the same drug in other diseases of obscure aetiology and notably sprue. In this article the authors record their observations on its use in two cases of idiopathic steatorrhoea. Neither patient had been away from Denmark. In the case of the second patient a woman of 28 years the condition was so bad that little benefit could be expected from any form of treatment. The first was a woman of 49 years who had been ill for about a year with lassitude thin pale watery stools abdominal distension and loss of weight 10 kilos in the year. On her admission she was passing copious pasty stools two daily there was no stomatitis serum calcium 9.1 mgm per cent phosphorus 4.0 mgm. there was achylia. Nicotinic acid was given intravenously in doses of 30 mgm twice daily later 40 mgm for nine days then orally in doses of 100 mgm five times a day as for pellagra. She was taking ordinary full diet. Within 48 hours of beginning the treatment the stools became firmer returning to the loose pulsatious form when the nicotinic acid was withheld for a week. This was practically the only symptom to be modified there was no effect on the hypotension the pigmentation the flat blood sugar tolerance curve or the achylia. In the second patient also there was observed a reduction in the quantity and water content of the stools. In neither patient was there any increase in absorption of dry substance lipid nitrogen calcium or ascorbic acid and none of the symptoms was changed except the diarrhoea.

H H S

FUCHS (Heinrich) & WISSELINK (Arnold) Versuch der Behandlung eines Falles von Sprue mit Nicotinsäure. [Trial of Nicotinic Acid in Sprue.]—*Klin Woch* 1939 May 20 Vol. 18. No 20 pp 722-723

Non tropical sprue appears to be allied to pellagra. Such a statement was almost bound to appear when the error crept in of diagnosing as sprue any condition in temperate climates in which one or more of the symptoms of tropical sprue were present.

The case described in this paper is that of a man of 31 years who gives no history of ever having lived abroad, who suffered from vague

abdominal symptoms which had led to such diagnoses as duodenal ulcer gastro-colic fistula duodenitis relaxed (offener) pylorus and others, and from stomatitis and oedema of legs, brittle finger-nails, a considerable degree of anaemia and osteoporosis. For these reasons a diagnosis of true sprue was made. Treatment by liver preparation, vitamin B₁ vitamin C and vigantol was ineffectual, so nicotinic acid was tried, also without benefit until increased dosage to 100 mgm. daily was employed.

Beyond the facts that erythrocytes numbered 2.5 million leucocytes 5,800 per cmm and haemoglobin 60 per cent. details of blood examination are not given. The size of red cells, presence or absence of erythroblasts, relative leucocyte counts, calcium content of serum or plasma, none of these is mentioned nor is there any analysis of the stools given—in short nothing to confirm the diagnosis of sprue. On the other hand the brittle and atrophied nails, the character of the tongue painful extremities with tingling in hands and feet, and the presence of osteoporosis are all indicative of a pellagroid condition. That is briefly we have here another record of pellagra reacting well to nicotinic acid and not (so far as the report given goes) a case of sprue at all.

H H S

BRILL (Lucien) with the collaboration of A. LAMBRECHTS & G. BARAC. Sprue non tropicale. Etude approfondie de quatre cas observés en Belgique. [An Intensive Study of Four Cases of Non-Tropical Sprue.]—*Rev. Belge Sci. Méd.* 1938, Oct. Vol. 10 No. 8. pp. 457-531. With 1 fig. [27 refs.]

[There is at present no satisfactory term for the condition here described. Sprue should be reserved for the tropical or subtropical disease and should not be applied vaguely to any cases with bulky and fatty stools any more than ulcerative lesions of rhinopharynx should be called non-tropical gangosa or yaws. Agam idiopathic steatorrhea is not good either for idiopathic merely means that we have not yet discovered the cause.]

The four cases here detailed were certainly intensively studied for the first in addition to full description in the text there are twenty two pages of tabulated analyses of the ingesta and excreta. All four passed fatty stools three had a low blood calcium, two a stomatitis. None had been in the tropics. The first was a woman of 66 years whose disease had persisted on and off for more than 20 years at times the stools numbered 14 a day and she had lost 53 kilos in weight but the anaemia was not great. The second, a woman of 53 years, had suffered with diarrhoea from childhood and for 12-18 months from stomatitis. The third, a woman of 20 years with a history of fatty diarrhoea dating back two years, showed marked tetany and low blood calcium (3.8 mgm per cent). Her sister had suffered similarly as a child for 6 years. The fourth, also a woman 34 years of age had had attacks of diarrhoea alternating with constipation for ten years or longer and at one time suffered from aphthous stomatitis she had lost 14 kilos in a year. She had no tetany and the plasma calcium was high, 12.4 mgm per cent.

The causation is discussed and the author concludes that the condition is due to multiple avitaminoses, A B C and D all being deficient associated with a reduction of the digestive secretions.

H H S

HOLMES (J MacDonald) Osteomalacia of the Spine associated with Chronic Diarrhoea.—*Lancet* 1939 Feb 4 pp 264-266 With 2 figs. on 1 plate.

An interesting case is described in which the history in some respects suggests a diagnosis of sprue contracted in Burma in fact this was the primary diagnosis. The non-committal title of the paper however is more accurate. The question of sprue is discussed but there are more points against this than in its favour. In spite of the symptom of diarrhoea having continued on and off for 18 years there is no anaemia the stools do not indicate steatorrhoea in spite also of the presence of tetany the blood calcium is practically normal again osteoporosis does not occur in tropical sprue H H S

FROSTAD (Simon) A Case of Non-tropic Sprue with Normo- and Megaloblasts in the Peripheral Blood.—*Acta Med Scandinavica* 1939 Vol 99 No 2-3 pp 257-261 With 2 figs.

The author gives an account of a man of 40 years who has suffered for 4 years with steatorrhoea which has defied every therapy attempted. The symptoms present were diarrhoea the stools 10-20 in the day being often thin and watery anaemia macrocytic in type but with many erythroblasts blood calcium 8.5 mgm per cent no indications of osteoporosis. The tongue papillae were atrophied but there had been no complaint of soreness and no stomatitis. No mention is made of the patient ever having left Scandinavia. [The fact that his condition had defied all treatment for so long and the presence of many nucleated red corpuscles are among the points of differentiation from tropical sprue] H H S

BURGDORF (A L.) & BARRY (Thomas A) Nontropical Sprue — *Jl Amer Med Assoc* 1939 June 17 Vol 112 No 24 pp 2508-2509

The case here recorded bears closer affinities to sprue than many which have been reported of late years under the denomination of non tropical sprue. The patient a man of 42 years living in Seattle had never been in the tropics. He had suffered for years from pain nausea and even vomiting after food and at the age of 36 a gastro-enterostomy had been performed to deal with an ulcer of the distal end of the stomach and one in the colon. His stools were watery without blood or mucus and 5-8 daily. He had lost much weight had a protruding abdomen and occasional oedema serum calcium was low 5 mgm. per cent but rose to 10 mgm on treatment. The blood showed reduction of erythrocytes to a little over two million of the macrocytic type no erythroblasts leucocytes in the earlier days 6.5 thousand, towards the end between six and seven times as many per cmm colour index usually above unity. In the course of 5 years he was admitted to hospital four times improvement followed treatment to such a degree that he was able to resume work. He died in hospital four days after his fourth admission.

[The chief points of difference from true sprue were the presence of osteoporosis which was marked in the vertebral column and had been recognized by radiography during life and the stools are described as watery not the copious fatty pale stools of sprue. No mention is made in the record of important points which doubtless must have

been studied, such as the basal metabolism, the results of faecal analyses, and the character of the blood sugar curve so we cannot say whether these agreed with the findings of true sprue.] H H S

LEPROSY

PRICE OF ABSTRACTS IN THIS SECTION

The lepra reaction according to STEIN (p. 38) is a hyperergic inflammation differing only in degree from non-reacting leprous tissue.

ROSS (p. 38) found decrease in the oxidized blood glutathione in 23 cases of leprosy.

RADNA (p. 38) shows that blood lipase is low in leprosy especially during reactions, thus confirming earlier work. He also (p. 38) found that blood calcium is reduced.

TANGUY (p. 38) found abnormal colloidal benzoin reactions in the c.s.f. in leprosy.

SÁENZ and PALOMINO (p. 39) state that tuberculoid leprosy can only be recognized with certainty by macroscopical examination but anaesthesia is constant in parts of the skin lesions. LOWE (p. 39) found tuberculoid changes in 11 of 13 palpable lymph glands excised in leprosy. SCHUJMAN (p. 39) regards tuberculoid leprosy as a special allergic form of the disease. He knows of no instance in which it has evolved into the lepromatous type. The Mitsuda reaction is positive.

CAMARGO and BUCHELLI (p. 38) give figures of the distribution of the 4 categories of lesions they describe—nervous cutaneous nasal and trophic.

DE BARROS (p. 40) thinks that without the use of the slit lamp many early eye lesions in leprosy may pass unrecognized. Infiltration or nodule formation may occur in the cornea, with keratitis and epikeratitis. In the iris he (p. 40) shows that there may be diffuse inflammation or miliary nodules. DE SOUZA (p. 41) describes a leper who showed signs of poikiloderma and erythromelalgia. BUCHELLI (p. 41) describes a patient with extensive polyneuritis regarded as leprotic in origin.

MUIR (p. 41) discusses the mental depression occasioned by the attitude of abhorrence adopted by the community towards lepers on account of the disfigurement caused by the disease.

NÚÑEZ ANDRADE (p. 42) comment on the causes of death in leprosy in Mexico enterocolitis is the chief but at Culcan pulmonary tuberculosis is the most frequent.

CAMPOS and ALAYON (p. 42) discuss the differential diagnosis of certain syphilitic and leprotic lesions.

BLACK and ROSS (p. 42) obtained only 37.5 per cent. of positive reactions with the complement fixation test using the bacillus of Lleras Acosta in 24 bacteriologically negative lepers (presumably 8 cases positive) and 10.3 per cent. positive in non-tuberculous controls. They therefore conclude that the test is of no practical value. The

Vernes test was not found to be of value in leprosy by MONTEL *et al* (p 43)

ROTBURG (p 43) shows that in nodular leprosy the lepromin test is negative but in the tuberculoid form the true positive reaction occurs. He gives the characters by which the reaction should be judged. JUSCHKO (p 44) uses the weal test with normal saline to discover the rate of water absorption which is rapid in leprosy. The test is not specific but gives an idea of the general condition.

In treatment DELANOE (p 44) advocates the changing of drugs every two days and gives a list of those used. PAGET *et al* (p 45) discuss the factors producing irritation on injection of various preparations of hydnocarpus oil. RADVA (p 45) uses local injection of chanmoogra preparations with Bier's hyperaemia in the treatment of trophic lesions. GRIMES (p 46) records excellent results in treatment by oral administration of extracts of *Hydrocotyle asiatica*. ETCHEVERRY (p 46) uses a 2-3 per cent solution of bile constituents in saline or glucose solution for injection into lepromata. Reactions are caused but reinjection can be carried out when these subside. Weaker solutions may be used for eye lesions.

BOENJAMIN (p 46) reports on treatment with Reenstierna's serum in 7 patients. No definite conclusions can be drawn but improvement occurred in some. BLUTH (p 47) reports success with Betaxin a preparation of vitamin B₁ in the treatment of vasodilatation of nerve origin. RADVA (p 47) finds that blood transfusions are beneficial in the treatment of lepra reactions. OBERDÖRFFER and COLLIER (p 47) advise daily exercises to overcome deformities of hands and feet caused by muscular paresis secondary to nerve lesions.

MANALANG (p 48) considers that leprosy is acquired chiefly if not entirely in infancy and early childhood through contact and that adults may be considered immune. He therefore proposes to release all adult lepers who wish to remain at home and utilize the money saved to protect the children of lepers by isolation. The Manila Council of Hygiene consider these views to be extreme and the proposals impracticable and prefer the proposals of the Cairo Congress.

MONACELLI (p 48) describes anti-leprosy measures in Sicily. DAVEY (p 48) describes how in connexion with the Uzuakoli leper colony in Nigeria, small isolation hamlets have been founded in the neighbouring villages where in return for assistance the lepers are segregated and regularly visited for treatment and for examination of contacts. This measure brings a large area under the supervision of experts.

Rat leprosy—*Haematopinus spinulosus* and *Laelaps echidninus* were found incapable of transmission of rat leprosy by MARCHOUX and CHORINE (p 49). The same authors (p 49) found that penetration of the skin by rat leprosy bacilli may occur through the minute wound caused when hair bulbs are pulled out.

Exposure to ultra violet rays for 10 minutes destroys the virulence of rat leprosy bacilli according to PRUDHOMME (p 50). COWDRY *et al* (p 50) report on the chemical alterations in rat leprosy tissues and rat leprosy bacilli.

In rat leprosy BERNY and CHABAUD (p 50) obtained some beneficial effects with certain selenium compounds. Borneol had some effect in retarding progress. CHORINE (p 50) used toxic doses of uranium oxide which produced rapid softening of the lesions.

STEIN (A. A.) Zur Morphologie der Lepreareaktion. I. Mitteilung. Histologische Veränderungen bei der I Typus von Lepreareaktionen. [Morphology of Leprosy Reaction. Histological Changes.]—*Internat. J. Leprosy* Manila. 1939 Apr-June. Vol. 7 No. 2. pp. 149-160 With 12 figs. on 3 plates.

This is a report on microscopical examinations of reacting leprosy tissues. The conclusion is reached that the changes are characteristic of "hyperergic" inflammation with perivascular infiltration of the cellular elements and lipid-containing Virchow's cells. It only differs in degree from the changes found in non-reacting leprosy tissues.

L. Rogers

ROSS (Hilary) Blood Glutathione in Leprosy.—*Internat. J. Leprosy* Manila. 1939 Jan.-Mar. Vol. 7 No. 1 pp. 51-55

Glutathione is a sulphur compound concerned in oxidation-reduction processes in cells. No alteration in the reduced glutathione was found in leprosy but there was a definite decrease in the oxidized substance in 23 cases.

L. R.

RADNA (R.) Sur la lipase du sérum des lépreux. [Lipase in the Serum of Lepers.]—*Ann. Soc. Belge de Méd. Trop.* 1939 Mar. 31 Vol. 19 No. 1 pp. 55-59

The authors record determinations of the serum lipase in 59 leprosy cases and in 69 non-leprosy persons, including 39 with intestinal worms, who gave normal readings. The leprosy cases showed mean readings below the normal and the lowest ones in bad cases with numerous lepra bacilli. The readings fall considerably during reactions. [This confirms earlier workers, including ROGERS.]

L. R.

RADNA (R.) Sur la teneur en calcium du sérum des indigènes du Congo Belge. [Calcium in the Serum of Lepers.]—*Ann. Soc. Belge de Méd. Trop.* 1939 Mar. 31 Vol. 19 No. 1 pp. 61-63

Observations made in the Belgian Congo are reported to show that the sera of healthy natives gave normal calcium contents, but in cachectic states, including bad leprosy cases, the calcium is reduced in the blood.

L. R.

TANGUY (Y.) La réaction au benjoin colloïdal dans le liquide céphalo-rachidien des lépreux. [The Colloidal Benzoin Reaction in the Spinal Fluid of Lepers.]—*Bull. Soc. Path. Exot.* 1939 Mar. 8 Vol. 32 No. 3 pp. 278-280

The author records that while examining the cerebrospinal fluid of eight lepers he noted an anomalous reaction with colloidal benzoin in the form of an increase in the size of the zone of precipitation. [See this *Bulletin* 1939 Vol. 36 p. 253 for details of this reaction.]

L. R.

FARIANI (G.) Sur un cas de lèpre indigène en Algérie. [A Case of Indigenous Leprosy in Algeria.]—*Bull. Soc. Path. Exot.* 1939 Mar. 8 Vol. 32 No. 3 pp. 278-279

SAENZ (Braulio) & PALOMINO (J Castro) Tuberculoid Leprosy — *Arch Dermat & Syph* 1939 Mar Vol. 39 No 3 pp 456-470 With 5 figs [24 refs.]

This is an illustrated account of seven cases of tuberculoid leprosy. The condition can only certainly be recognised by microscopical examination. It is mild with a tendency to recover and does not show lepra reactions so it is important that it should be diagnosed. Anaesthesia is a constant symptom in parts of the skin lesions and the bacilli may be absent or very scarce. L R

LOWE (John) Tuberculoid Changes In Lymph Nodes In Leprosy — *Internal J Leprosy* Manila 1939 Jan.-Mar Vol. 7 No 1 pp 73-74

Palpable lymph glands have been excised in thirteen cases of leprosy and eleven of them were found to show tuberculoid changes. This finding is considered to be of interest though perhaps not of great practical importance. L R

SCHUJMAN (Salomon) Evolución y pronóstico de la lepra tuberculoide (Estudio realizado en 100 casos vigilados de 2 a 10 años) [Tuberculoid Leprosy Evolution and Prognosis.]—*Rev Brasileira Leprologia* S Paulo 1939 Mar Vol. 7 No 1 pp 1-25 With 14 figs on 7 plates English summary

The author states that he does not know of a recorded case of the evolution of tuberculoid leprosy into the lepromatous form nor has he met with any in 100 cases, although a lepra reaction has been mistaken for it. Mitsuda's skin test is positive in tuberculoid and negative in lepromatous cases. The author's tuberculoid cases showed improvement and cure in 30 and persistence with little change for many years in the others. He regards it as a special allergic form of the disease. L R

TAPPEINER (Sepp) Ueber Lepra mixta. [Mixed Leprosy]—*Arch f Dermat u Syph* 1939 Mar 18 Vol 178 No 5 pp 570-581 With 7 figs.

GIL YRPEZ (Carlos) La lepra tuberculoide [Tuberculoid Leprosy]—*Bolet Ministerio de Sanidad y Asistencia Social* Caracas. 1939 Mar Vol. 4 No 2. pp 64-70 With 4 plates.

LIMA (Lauro de Souza) Classificação das leprides [Classification of Leprides.]—*Rev Brasileira Leprologia* S Paulo 1938 Vol. 6 Special No pp. 63-69 With 2 figs

CAMARGO (Arthur T) & BECHELLI (Luiz M) Natureza e sede das lesões iniciais da lepra. [Nature and Site of the Initial Lesions in Leprosy]—*Rev Brasileira Leprologia* S Paulo 1938 Vol. 6 Special No pp 35-48 [22 refs] English summary

The authors have made a careful study of 1067 lepers in Asilo-Colônia Cocais and divide them into four categories (1) Those with disturbances of nervous origin (2) Those with cutaneous lesions

disease as leprosy is not nearly as infectious as tuberculosis. Suitable employment helps to restore self respect. In the Louisiana leprosarium the author found 18 per cent. of the patients suffering from mental depression and 3 per cent from definite psychoses. Sympathetic treatment is of the greatest importance. L. R.

NÚÑEZ ANDRADE (Roberto) *Causas más frecuentes de mortalidad en la lepra* [The Commonest Causes of Death in Leprosy].—*Medicina Mexico*. 1939 June 10 Vol 19 No. 341 pp. 173-176.

The figures of deaths of lepers in Mexico are given and also those for the Culoon colony the former deals with 1,074 the latter are PINEDA's returns based on 300 deaths, but the contrasts are so marked that they are worth noting. Of the 1,074 there were 384 uncertified medically as to the actual cause (35.7 per cent.) The differences are best seen from the following table of percentages compiled from figures in the text —

	Mexico	Culoon
Pulmonary tuberculosis	1.8	24.0
Nephritis	2.3	16.3
Bronchopneumonia	3.1	9.3
Dysentery	0.6	3.8
	(amoebic)	(not specified)
Enterocolitis	15.5	1.3
Leprotic cachexia	9.9	2.3

H H S

CAMPOS (Nelson Sousa) & ALAYON (Fernando) *Lepre e sífilis* [Leprosy and Syphilis].—*Rev Brasileira Leprologia* S Paulo 1938 Vol. 6 Special No. pp 101-111 With 6 figs. & 3 plates. English summary (7 lines)

The authors discuss the similarity between certain syphillides and leprotic lesions particularly tuberculo-carcinate lesions of the skin. They give in detail six cases in which the diagnosis on purely clinical grounds was in doubt but was determined by serological reactions being positive for syphilis while examination of local lesions and of nasal mucosa was negative for Hansen's bacillus. H H S

OSERDORFFER (Manfred J.) & COLLIER (D) *Lupus vulgaris bei Knotenlepra* [Lupus Vulgaris in Nodular Leprosy].—*Arch f Schiffs u Trop Hyg* 1939 Apr Vol. 43 No 4 pp 170-172. With 3 figs.

BLACK (Sam H.) & ROSS (Hilary) *The Complement Fixation Reaction of Lieras in Leprosy*.—*Public Health Rep* 1939 Mar 10 Vol. 54 No 10 pp. 392-399

The authors report a comprehensive test of the claims of the Lieras Acosta reaction by complement fixation with an antigen prepared from an acid fast bacillus cultivated from a case of leprosy. Lieras Acosta claimed positive reactions in 89.38 per cent in bacteriologically positive cases and 82.5 in negative neural cases in which alone the test

would be of real value. In diseases other than leprosy 1.52 per cent were positive. The present authors have tested 164 positive and 24 negative leprosy cases and 379 other cases including 50 of tuberculosis. They obtained only 37.5 per cent of positive reactions in neural leprosy and 10.3 in non tuberculous controls. They therefore conclude that the test is of no practical value. [See this *Bulletin* 1938 Vol 35 pp. 551-587] L. R.

LOWE (John) & GREVAL (S. D. S.) Complement Fixation in Leprosy and Other Diseases by the Witebsky-Klingenstein and Kahn (W.K.K.) Antigen.—*Indian J Med Res* 1939 Jan Vol. 28 No 3 pp 833-841 [16 refs.]

MONTÉL (L. R.) LE VAN PHUNG DO-VAN HOANH & TRAN VAN HANH 528 cas de lèpre. Formules cytologiques. Réactions de flocculation de Verne. Analyses du sang. Diagnostic bactériologique [Laboratory Investigations in Leprosy].—*Rev Méd Française d'Extrême-Orient* 1939 May No 3 pp 623-627

The authors record the results of laboratory investigations in Indo-China. Cytological observations showed an increase in the eosinophils but it was not of diagnostic importance. Their bacteriological diagnostic examinations were in accordance with general experience. Verne's flocculation reaction was not more frequently positive in lepers than in healthy people so is of no diagnostic import. L. R.

RUOX & MAASS (E.) Zur Frage der Rubino-Reaktion [Rubino Reaction.]—Reprinted from *Festschrift Bernhard Nocht z. 50 Geburtstag von seinen Freunden u. Schülern* Hamburg 1937 pp 535-537

DEGOTTE (J.) Diagnostic précoce de la lèpre. Valeur comparée des diverses recherches bactériologiques et cliniques [Early Diagnosis in Leprosy. Comparison of Bacteriological and Clinical Methods].—*Ann Soc Belge de Méd Trop* 1939 Dec. 31 Vol 18. No. 4 pp 533-537

DUBOIS (A.) & RADNA (R.) Incisions multiples de la peau dans le diagnostic bactérioscopique de la lèpre. Signification des bacilles acido-résistants rencontrés [Significance of Acid-Fast Bacilli in the Skin in Leprosy].—*Ann Soc. Belge de Méd Trop* 1939 Dec 31 Vol 18 No. 4 pp 547-552.

ROTBERG (A.) The Reading of the Lepromin Test.—*Internat J Leprosy* Manila. 1939 Apr-June Vol. 7 No 2. pp 161-166

This paper is best summarized in the author's own conclusions —

The present system of reading the lepromin test was established arbitrarily and the findings have been related to the different forms of leprosy the immunological characteristics of which are still uncertain. From this combination of unknown factors much confusion may arise. For example, of 194 nodular cases 74 gave "positive" reactions that could evidently have no immunological or prognostic significance.

Studying the evolution of the reaction in two very distinct groups of cases nodular and tuberculoid with undoubtedly opposite conditions of

disease as leprosy is not nearly as infectious as tuberculosis. Suitable employment helps to restore self respect. In the Louisiana leprosarium the author found 18 per cent of the patients suffering from mental depression and 3 per cent. from definite psychoses. Sympathetic treatment is of the greatest importance L. R.

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would be of real value. In diseases other than leprosy 152 per cent were positive. The present authors have tested 104 positive and 24 negative leprosy cases and 379 other cases including 50 of tuberculosis. They obtained only 37.5 per cent of positive reactions in neural leprosy and 10.3 in non tuberculous controls. They therefore conclude that the test is of no practical value. [See this *Bulletin* 1938 Vol 35 pp. 551-557] J R

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Studying the evolution of the reaction in two very distinct groups of cases, nodular and tuberculoid with undoubtedly opposite conditions of

immunity the author points out the essential distinctive features of the reactions typical of these forms of the disease.

"In the nodular form the test is negative—there is no reaction, or only a small papular one due to nonspecific factors, which reaches its maximum before the fourth or fifth day—seldom is larger than 5 mm. and may persist until the fourth week.

"In the tuberculous form the true positive reaction occurs—a nodular lesion, often suppurating, usually belated in appearing, of progressive evolution, generally reaching its maximum from the second to the sixth week, seldom less than 5 mm. in diameter in the fourth week.

"The dimensional criterion of positivity is not sufficient, and the test must be performed by trained observers familiar with the clinical signs. Even so it is necessary to admit a large group of doubtful reactions, of indefinite aspect and borderline dimensions (4-6 mm. diameter). Recognition of doubtful groups permits not only avoiding error of reporting reactions, but also avoids possible faults due to different antigenic values of different lots of lepromin, the standardisation of which still presents a problem.

L. R.

JUSCHKO (S. S.) Hydrophilic des gewebes bei Lepra. [Absorption of Water by the Tissues in Leprosy]—*Internat. J. Leprosy* Manila, 1939 Jan.-Mar Vol. 7 No. 1 pp. 41-50

The author discusses the causation of the water exchange in the tissues in leprosy with the help of the "weal test" of McClure and Aldrich. An injection of 0.2 cc. of normal saline is made intracutaneously on the inner surface of the forearm and the time required for the disappearance of the weal noted. The normal time in controls was 53 minutes, and in 13 cases of leprosy it varied from 17 to 43 minutes. Disturbance in the water exchange occurred in 83 per cent. of cases, with acceleration parallel with the extent of the leprosy processes. The test like the erythrocyte sedimentation rate helps to determine the general condition of the patient.

L. R.

DELANOE (E.) Réflexions au sujet de la lèpre [Reflections on Leprosy]—*Bull. Soc. Path. Exot.* 1939 Mar 8 Vol. 32 No. 3 pp. 323-328

This paper advocates treating cases of leprosy in hospital with changes in the drug used every two days so as to prevent the bacilli becoming accustomed to any one preparation. Among those advocated are arsenobenzol chaulmoogra oil, Solganum B irradiated tri-calcine gynocardate of soda, salts of calcium, and phosphates, hyrganol, vaccine BCG oil of camphor quinine, methylene blue kounyl etc. The author claims very much better results by this plan of polypharmacy.

L. R.

TRAMBLAN (S.) Problems connected with the Diagnosis and Treatment of Leprosy—*J. Indian Med. Assoc.* 1939 June Vol. 8 No. 9 pp. 516-518

CAMBRÉSIS (H.) Rappel des notions essentielles sur l'état actuel du traitement de la lèpre [Treatment of Leprosy]—*Rec. Méd. et Hyg. Trop.* 1938 Nov-Dec Vol. 30 No. 6 pp. 320-323.

details of 48 cases are recorded here. Doubt arose as to its cholera nature however when the causal vibrio was found to be one which caused haemolysis of sheep erythrocytes in nutrient bouillon after 24 hours incubation. The conjunction of a haemolytic vibrio with true epidemic cholera, having a mortality rate of 65 per cent. was a new event. It could only be an El Tor vibrio as was shown by its cultural and serological characters, but El Tor vibrios, in spite of their close relationship to cholera vibrios, are practically non-pathogenic. A comprehensive survey is made in this article, of the whole El Tor question and a very good summary is made of the various contributions to that controversy which began in 1905 and still continues. This El Tor vibrio belongs to Gardner and Venkatraman's subgroup O 1 to Fleisberg's type I to the Ogawa serological strain and is haemolytic to goat cells. The epidemic caused by it was over in six months and did not occur again. The identity of the organism does not seem to be in doubt but the author asks whether considering the weakness of the haemolytic power of the vibrio when freshly isolated, it is not possible that in previous instances El Tor vibrios may have caused epidemics and been simply ranked as true cholera vibrios. [See also this *Bulletin* 1939 Vol. 36 p. 374]

h. This is an English version of the same paper

IV F H

GIRFEN (R.) Les différences entre le vibron El Tor et le vibron cholérique [Differentiation of the El Tor and Cholera Vibrios].—*Ann Inst Pasteur* 1939 Sept. Vol. 63. No. 3 pp 293-301 [15 refs]

The specific relationships of cholera, El Tor and Celebes vibrios are considered together. Examination of two of the Celebes (Macassar) strains confirmed that they are identical with the specific El Tor vibrio. El Tor agglutinable vibrios are possessed of an exohaemolysin for goat's blood in bouillon, while cholera vibrios show under the same circumstances only an endohaemolysin [see also this *Bulletin* 1939 Vol. 36 p. 373]. It has been shown also that both cholera and El Tor vibrios possess the same polysaccharide but cholera possesses protein I and El Tor protein II. An examination of 81 strains of cholera and 31 strains of El Tor for the Voges-Proskauer reaction gave 76 cholera strains negative and 23 El Tor positive [see also this *Bulletin* 1939 Vol. 36 p. 372]. So far it seems that haemolysis of goat's blood in bouillon and the Voges-Proskauer reactions are the only practical means by which the two vibrios can be distinguished. A third testing reaction, the reaction to heat is described in this work.—Cholera vibrios in saline suspension are rendered inagglutinable by heating at 58°C for 3 hours that is to say the suspension is no longer rendered clear by the anticholera serum. An El Tor suspension, on the other hand, is not affected in its agglutinability. Celebes vibrios behave like the El Tor vibrios. A temperature of 60°C is necessary to destroy the agglutinability of these two latter vibrios. The conclusion is reached that "in general characters and chemical structure the El Tor vibrio occupies a position intermediate between the cholera vibrio and non-agglutinable vibrios" and that the two vibrios although identical in antigenic structure, do represent different species [see also this *Bulletin* 1939 Vol. 36 pp. 374-375].

IV F H

MAYNARD (N H) Treatment of Tropic Ulcers.—*Leprosy Review* 1939 Apr Vol 16 No. 2 pp. 118-120 With 2 figs.

GRIMES (M) Le traitement de la lèpre par l'hydrocotyle. (Note préliminaire.) [Treatment with Hydrocotyle.]—*Bull. Soc. Path. Exot* 1939 June 14 Vol 32 No 6 pp. 692-693

The author reports on a year's trial of fluid and alcoholic extracts of the dried plant *Hydrocotyle asiatica* orally. He claims the most remarkably beneficial results, including the rapid resolution of eye lesions. It is most effective in lepromatous cases but neural ones recover more slowly although perforating ulcers heal quickly. The treatment is thus considered to hold out great hopes. L. R.

DE ALMEIDA (A Otonio) & COSTA (Henrique Moura) Treatment of Leprosy by Oxygen under High Pressure associated with Methylene Blue.—*Rev. Brasileira Leprologia*. S. Paulo 1939. Vol 6. Special no pp. 237-265 With 82 figs on 30 plates. (82 refs.)

ETCHEVERRY (Virgilio P) Las sales biliares en el tratamiento de la lepra [Bile Salts in the Treatment of Leprosy]—*Rev. Brasileira Leprologia*. S. Paulo. 1939 June Vol 7 No. 2 pp. 157-164 English summary (8 lines)

The author was first led to consider the use of bile salts in the treatment of leprosy by observing a patient suffering from macular leprosy whose lesions appeared to undergo a favourable change while he was affected with chronic jaundice. In 1930 he began to inject solutions of ox-bile into lepromata and noticed that some became smaller and even disappeared, and he passed from this to the use of bile salts for lepromata and for the ocular lesions of leprosy.

For the former he used *Fel tauri depuratum siccum* or cholate of sodium which is prepared from ox bile by removing mucin and pigments and then drying and powdering the product. It consists mainly of sodium taurocholate and glycocholate together with free bile acids, fatty acids cholesterol and phosphatides. Its composition varies. For injection the vehicle employed is physiological saline or isotonic glucose. A 1 per cent solution gives slight reaction and needs frequent repetition. 2-3 per cent causes a stronger reaction and may give rise to some necrosis. 4-5 per cent or stronger causes violent inflammation and considerable destruction of tissue. Two to three per cent. is the strength preferred and the reaction has usually subsided so that a second injection can be given in 8-10 days.

For eye lesions the weaker solutions are used, 0.5 0.75 or 1 per cent either in the form of an ointment or as a prolonged bath (20 minutes or so at a time and twice or thrice daily if tolerated) or the preparation, after purification by means of animal charcoal is dissolved in isotonic glucose and injected subconjunctivally. H. H. S.

BOENJAMIN (R) Toepassing van Reenstierma's antileproserum bij enkele leproten te Batavia [Treatment by Reenstierma's Anti-leprosy Serum in Batavia.]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1939 May 30 Vol 79 No 22 pp. 1348-1370 English summary

The treatment consisted of one or more series of three injections with an interval of about a month between series. The serum injections were given three times a week intraglutally with a dose of 10 cc.

It is quite obvious that no definite conclusions can be drawn from the above described experiment with the antileprosy serum of RILNSTIERNA. The material used is far too small and the duration of observation too short. Moreover in one and the same patient improvement was observed in one symptom or group of symptoms paralleling a retrogression in other disturbances as a result of which any accurate judgement was rendered very difficult. Again the connection between improvement and treatment by the serum injections is not always convincing since the possibility of spontaneous retrogression of the symptoms must not be forgotten. We may summarize the course of the disease in our seven patients during their serum treatment, in brief into four groups

- a Two showed improvement
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- d One got worse.

BLUETH (Alfred) *Betaxin in the Treatment of Leprosy—Leprosy Review* 1939 Apr Vol 10 No 2 pp 109-112.

The author reports on a trial of the synthetic crystalline vitamin B₂ substance Betaxin in the treatment of leprosy cases with polyneuritic and polyneuralgic symptoms. Brief notes of three cases are given in which beneficial results are reported in vaso-dilatory symptoms of nerve origin in the hands and feet but general and arthritic symptoms were unaffected. L R

RADNA (R.) *Sur le traitement de la réaction lépreuse [Treatment of Leprosy Reactions.]—Ann. Soc. Belge de Méd Trop* 1939 June 30 Vol 19 No 2 pp 227-233.

The treatment of seven cases with intravenous transfusions of blood in quantities of 100 to 180 cc is reported rapidly to bring down the temperature with subsidence of the local congestions and severe pain. Subsequently chaulmoogra treatment is better borne by the patients. L R

OBERDORFFER (Manfred J) & COLLIER (Douglas R) *Prevention and Treatment of Ulcers and Deformities in Leprosy—Leprosy Review* 1939 July Vol 10 No 3 pp 161-163 With 12 figs. [37 refs.]

The authors suggest that deformities of the hand and foot largely result from paresis of the intrinsic muscles secondary to nerve lesions leading to atrophy of the bones due to diminished circulation. They therefore advise daily exercises when the conditions permit to help to restore the lost functions. Information regarding suitable exercises is given. When ulcers are present 2 per cent mercurochrome with honey cod liver oil zinc oxide powder bismuth subnitrate and vaseline are recommended as a dressing. L R

LOWE (J) & CHATTERJI (S N) *Surgical Removal of the Sheath of Ulnar Nerve in Severe Leprous Neuritis.—Leprosy in India* 1939 Apr Vol 11 No 2 pp 44-52. With 6 figs. on 2 plates.

SARKAR (Sarasi Lal) & BHATTACHARYYA (Bem Madhab) *The Action of Cobra-Toxin on the Nerve Pain of Leprosy—Jl. Indian Med Assoc* 1939 Apr Vol 8. No 7 pp 412-413

A brief report of three cases with slight benefit in only one. L R.

MAYNARD (N H) Treatment of Trophic Ulcers.—*Leprosy Review* 1939 Apr Vol 10 No. 2 pp. 118-120 With 2 figs.

GRIMES (M) Le traitement de la lèpre par l'hydrocotyle (Note préliminaire) [Treatment with Hydrocotyle].—*Bull. Soc. Path. Exot* 1939 June 14 Vol 32, No. 6, pp. 692-693

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A brief report of three cases with slight benefit in only one. L. R.

Where the roots are pulled out a minute wound is formed through which the bacilli were found by studies of transverse sections, to penetrate.
L. R.

PRUD'HOMME (R. O.) Affaiblissement de la virulence du bacille de Stefanaky par les rayons ultra violets. [Ultra Violet Rays and Rat Leprosy Bacilli].—*Internat. J. Leprosy* Manila. 1939 Jan-Mar Vol 7 No. 1 pp 67-71

This note records experiments to show that irradiation for 2 to 5 minutes enfeebles, and that for 10 minutes destroys, the virulence of rat leprosy bacilli
L. R.

COWDREY (E. V.) RAYOLD (Amand) & PARKER (D. M.) Physical and Chemical Properties of Rat Leprosy Bacilli.—*Proc Soc Experim. Biol & Med* 1939 June Vol 41 No 2 pp 341-345

This is a technical paper on attempts to determine the chemical alterations in leprosy tissues and leprosy bacilli by isolating the latter from the former and the use of spectroscopical analysis. Rat leprosy nodules were used. A significant alteration in the phosphorus and calcium ratios in the bacilli was found in the form of an increase in the phosphorus and a decrease in the calcium. The sodium and magnesium showed no change and only slight traces of potassium were found in either the bacilli or the control material. The mineral ash of nodules is mostly derived from the tissue cells, and a green fluorescence from the leprosy bacilli.
L. R.

BERRY (P.) & CHABAUD (A.) Essais de traitement de la lèpre murine. [Treatment of Rat Leprosy].—*Bull Soc Path Exot.* 1939 Mar 8 Vol 32 No 3 pp 316-322

Trials of the essence of turpentine in oily solution, borneol in oily solution, chloroform extracts of chaunmoogra seeds and oil of Lettonia pine have been tried by injection in rat leprosy with negative results, except for some retardation of the disease for a time with borneol.

A number of new chemotherapeutic selenium compounds have also been tested which were mostly very toxic but nos. 1443 F and 1424 F exerted some beneficial effect in the early stages of the rat infection.

L. R.

CHABAUD (A.) Essais de traitement de la lèpre murine. [Trials of Rat Leprosy Treatment].—*Bull Soc Path Exot* 1939 June 14 Vol 32 No 6 pp 591-592

This paper reports negative results from the trials of aqueous extracts of cypress, coloncota and terebenthine. Borneol however had a certain power of retarding the progress without averting a fatal issue
L. R.

CHORINE (V.) Essais de traitement de la lèpre murine. [Trials of Rat Leprosy Treatment].—*Bull Soc Path Exot.* 1939 June 14 Vol 32 No 6 pp 587-591

The following substances were found inactive against rat leprosy oxides of glucinum yttrium thallium, zirconium mercuriochrome

iodorubidium and bismuthate of quinine. On the other hand toxic doses of uranium oxide produced a rapid softening of the lesions and elimination of the rat leprosy bacilli which were found to be dead

L R

CHABAUD (A) Evolution sur la souris de quatre souches de lepre du rat. (Rat Leprosy in Mice).—*Bull Soc Path Exot* 1939 Feb 8 Vol 32 No 2. pp 195-201

LOWE (John) A Bandicoot found infected with Stefansky's Bacillus.—*Internat J Leprosy* Manila 1939 Jan-Mar Vol. 7 No 1 p 75

MALARIA

PRECIS OF ABSTRACTS IN THIS SECTION

GILROY (p 52) describes conditions in nine Darjeeling tea gardens where the malaria attack rate was 370 per 1000 and the spleen rate 68 per cent. *P. falciparum* is the commonest parasite and *A. minimus* the vector. Kala azar is common. RUSSELL and JACOB (p 53) show that in a coastal area in Madras man made malaria due to the digging of pits to the subsoil water level for the watering of casuarina trees is the cause of decline in prosperity. *A. culicifacies* is the chief carrier and *P. falciparum* the commonest parasite.

BORR (p 53) regards *P. ovale* as a valid species immunologically distinct from *P. vivax*. It is usually found in Africa but as it becomes better known will probably be discovered in other countries. He gives an account of 20 definite cases of *P. ovale* infection. Discussing the results of 108 primary and 53 reinoculations with *P. ovale* SINTON *et al* (p 54) found only one instance of true relapse even in the absence of drug treatment.

Comparing the Roman and Ethiopian strains of *P. falciparum* MOSNA (p 55) concludes that the former is the more virulent and the latter resembles tropical strains from Africa and India. Crescents were found by BASU (p 55) to be incapable of infecting *A. stephensi* during the first 4 days of their appearance in the blood but thereafter were highly infective until the 26th day. He thinks that a host who has recovered from initial infection is not immune against reinfection with the same strain. CHOPRA and BASU (p 55) found that protosol failed to prevent infection of *A. stephensi* when given to crescent carriers.

FIELD and LE FLEMING (p 56) discuss the appearance of *P. vivax* in thick films.

DE BURCA (p 56) shows that in Quetta cantonment in 1938 *A. superpictus* was by far the commonest anopheline. *A. culicifacies* was much less in evidence than in previous years. Regular spraying of barracks was a satisfactory measure.

SINTON (p 56) summarizes his views on immunity. There is an antiparasitic and an antitoxic element and defence is cellular and humoral. He regards the tolerance of indigenous populations of endemic areas as natural rather than acquired but infections produce acquired immunity the duration of which varies with the species of

plasmodia. As a result of experiments with *P. knowlesi* in rhesus monkeys he (p. 57) enunciates general principles: treatment of individuals only rarely exposed to infection should aim at radical cure; in those constantly exposed it should aim only at clinical (and not radical) cure of each attack; in those exposed temporarily to frequent infections drug prophylaxis should be employed.

WOLFF (p. 57) describes a test in which 2 drops of serum are mixed with 1.0 cc. of buffer solution at different pH values. Normal sera usually show faint cloudiness at pH 7.0; positive sera show cloudiness up to 8.0 or 8.4. The results are very like those of Henry's test.

Bird and Monkey Malaria.—REDMOND (p. 58) shows that in the bird malarias the degree of immunity is directly correlated with the virulence of the strains, and that cross immunity between species occurs.

CASATI (p. 58) claims to have found bodies resembling the exoerythrocytic schizonts of bird malaria, in the endothelial cells of the brain of a girl dying during chronic malaria. JACOBI (p. 59) describes the course of *P. gallinaceum* infections of fowls. Exoerythrocytic schizonts are regularly found between the 25th and 30th days. JAMES (p. 59) found that in the acute phase birds infected with sporozoites, and in the chronic phase those infected by blood inoculation, show the greater mortality. Exoerythrocytic schizonts are found to be connected with these high mortalities, and can arise from forms which have developed in red blood cells. MAXWELL (p. 60) though suggesting further work, does not believe that exoerythrocytic schizonts represent developmental forms of toxoplasma. With GOLDSTEIN he (p. 60) shows that they are most common just after parasites first appear in the blood.

MEADOW (p. 61) describes the splenic reaction in *P. knowlesi* infection of monkeys.

RODRIGUEZ and MUYLLE (p. 61) show that *P. vivax* can survive in chimpanzees for at least 48 days. C IV

GILROY (Alan). Health in Tea Gardens of the Darjeeling Terai with Special Reference to Malaria.—*Jl Malaria Inst of India*. 1939. June. Vol. 2. No. 2. pp. 165-179. With 2 charts.

This is an account of the health conditions of nine tea gardens, in the Darjeeling Terai, with a fairly stable population of about 9,300. In 1938 the birth rate was 41 and the death rate 33 per thousand. The infant death rate was 122. Of the 309 deaths 68 were attributed to malaria and 48 to kala azar. The malaria attack rate was 370 per thousand, with a case mortality rate of 2 per cent. There is no evidence that kala azar is decreasing though thorough treatment is keeping the disease in check. It is common among new-comers, some of whom come to the estate solely for treatment and abscond when cured.

Of the 68 malaria deaths (21 per cent. of the total mortality) 40 occurred in infants or children. The spleen rate of 1,068 children examined was 68 per cent. The children known to be suffering from kala azar were excluded from this examination. The parasite rate of 558 children was 49 per cent. Of the 273 positive examinations *P. falciparum* was found in 188, *P. vivax* in 20 and *P. malariae* in 18. Mixed infections were found in 47.

Fourteen species of Anopheles were identified. The only species found infected was *A. minimus* 35 infected among 421 dissected. It was not possible to correlate malaria incidence with the presence of mosquitoes in houses. The malaria curve was rising at a time when most breeding places were dry and anophelines could not be found in houses. The diagnosis of malaria in estate dispensaries was made on clinical grounds and it is possible that influenza and malaria are not infrequently confused.

Norman White

RUSSELL (Paul F) & JACOB (V P) Epidemiology of Malaria in the Ennore-Nellore Coastal Area Madras Presidency, India.—*Jl Malaria Inst of India* 1939 June. Vol 2 No 2 pp 131-152. With 3 figs. on 2 plates & 2 charts [16 refs.]

The Ennore-Nellore Coastal Area is a narrow strip of land some 120 miles long and $1\frac{1}{4}$ to 3 miles in width between the Buckingham Canal and the Bay of Bengal immediately to the north of the City of Madras. It contains numerous villages none of which enjoys the prosperity it formerly had. For this malaria is responsible and malaria here is man made.

The soil is sandy. Casuarina trees grow well other crops are all but non-existent. Casuarina is grown for fire-wood. To water the young trees shallow wells or pits are dug to the sub-soil water which is found from 2 to 6 feet below the surface. These casuarina pits are the chief anopheline breeding places, and they are very numerous.

Anophelines collected and examined numbered 27 187 larvae and 7 227 adults. Of the larvae 18 323 were *A. subpictus* and 6 860 *culicifacies*. Other species found were —*annularis barbistris hyrcanus jamezi karwari pallidus stephensi tessellatus vagus* and *varuna*. *A. culicifacies* is the chief carrier though its infection rate was not high. Of 984 dissected the oöcyst index was 0.68 per cent and the sporozoite index 0.10 per cent. Positive precipitin reactions with *culicifacies* were human 80 per cent cow 20 per cent with *subpictus* human 3.1 per cent cow 96.0 per cent.

Spleen indices averaged 63.4 per cent, and positive blood smears 63.2 per cent. Of the positive smears 56.7 per cent contained *P. falciparum* 36.1 per cent *vivax* and 4.4 per cent *malariae*.

N W

WATSON (Robert Briggs) FAUST (Ernest Carroll) & SIMMONS (James Stevens) Recent Advances in the Epidemiology of Malaria.—*Southern Med Jl* 1939 Aug Vol. 32 No 8 pp 853-857 [21 refs.]

BOCK (Erich) Zur Epidemiologie Klinik und Parasitologie der durch das *Plasmodium ovale* Stephens 1922 hervorgerufenen Malaria. [Epidemiological, Clinical and Parasitological Features of Malaria produced by *Plasmodium ovale* Stephens, 1922.]—*Arch f Schiffs- u Trop Hyg* 1939 Aug Vol. 43 No 8 pp 327-352. With 15 figs. (1 map) [36 refs.]

In the first place the author deals with Stephens's discovery of *Plasmodium ovale* in 1922 and with the work of other investigators who followed him. He then proceeds to consider his own contribution

to the subject. He studied 20 certain and one doubtful case of *P. ovale* infection. Of these 1 case came from Nigeria 1 from Liberia, 2 from Spanish Guinea, 1 from Fernando Po 15 from the Cameroons and 1 from East Africa. Of the places in the Cameroons from which *P. ovale* infected patients came Tiko stands at the top with 8 out of a total of 15 cases. He considers that *P. ovale* is essentially an African species of malarial parasite and is found particularly in Central Africa. He thinks that as the morphology of the parasite becomes better known to investigators the positive findings in areas outside Africa will increase. A table is given showing cases of *P. ovale* infection recorded in literature in and outside Africa. In the consideration of the symptomatology of *P. ovale* infection he records the characteristic features which are well known, such as the tendency for the infection to die out spontaneously in cases of therapeutically induced malaria. As regards the incubation period the average was found to be 10 days with extremes of 3 and 28 days. From his investigations he finds that *Plasmodium vivax* and *Plasmodium ovale* are immunologically different. As regards the morphology of the parasite he finds that during an infection the number of the nuclei of dividing forms varies. It is possible that this feature is connected with the effect on the parasite of the metabolic activities of the body of the host or is an expression of degeneration. From a consideration of the morphological, clinical and immunological features of the parasite he is of opinion that *Plasmodium ovale* should be recognized as a malarial species.

E D W Girdg

SIXTON (J A) HUTTON (E L.) & SHUTZ (P G) Studies of Infections with *Plasmodium ovale*. I. Natural Resistance to *Ovale* Infections.—*Trans Roy Soc Trop Med & Hyg* 1939 Apr 6. Vol 32. No. 6 pp 751-762 [40 refs.]

During seven years 106 primary infections with *P. ovale* have been induced at Horton Hospital and 53 remoculations have been carried out. Four strains of *P. ovale* have been used, coming from the Belgian Congo Nigeria Sierra Leone and the Gold Coast respectively. Most of the patients were Europeans who had never previously been exposed to infection with *P. ovale* and very few had been infected with malaria of any kind. Infections were either transmitted from patient to patient by blood injection or by infected mosquitoes, *A. maculipennis* var. *atroperous*. Eighty-six patients were inoculated with blood parasites and 22 with mosquito parasites.

These *ovale* infections were characterized by a great infrequency of clinical relapses, even in the absence of drug treatment. It was possible in some untreated cases to detect, by frequent prolonged examinations, the presence of parasites for as long as two to three months but in only two cases were there any clinical manifestations after the primary attack. There was only one instance of a true relapse. There was no evidence of the prolonged primary latency which is frequently observed in *vivax* infections. Varying grades of susceptibility to the pathogenic effects of infection with *P. ovale* were observed but there was no great natural resistance to the acquisition of infection.

In an appendix the recorded geographical distribution of *P. ovale* is discussed. The main area of natural distribution of this parasite is Equatorial and Central Africa.

N IV

MOSNA (Ezio) Sulla malaria indotta da *Plasmodium innocuatum* (*falciparum*) ceppo etiopico e ceppo campagna romana. [Induced Malaria, with Strains of *P. falciparum* from Ethiopia and the Roman Campagna]—*Riv di Parassit* Rome 1938 Dec Vol 2. No 4 pp 275-287 With 10 charts English summary (9 lines)

Two groups each of four individuals were inoculated with Ethiopian and Roman strains of *P. falciparum* respectively. In each case citrated infected blood was injected intramuscularly.

With the Ethiopian strain the incubation periods were 11 10 9 and 10 days with the Roman strain 10 11 12 and 12 days.

No morphological differences between the two strains were noted.

From the clinical point of view there was a considerable difference between the two groups. The febrile attacks produced by the Roman strain were longer more severe and required two or three times as much quinine to control them. Relapses were likewise more numerous after infections with the Roman strain.

The author states that his observations show that the Ethiopian strain from the clinical point of view is similar to the tropical strains of Africa and India as described by KOCH and JAMES. N IV

BASU (B. C.) Studies on the Biology of the Malaria Parasite (*Plasmodium falciparum*)—*Jl Malaria Inst of India* 1939 June Vol 2. No 2 pp 155-157

Batches of *A. stephensi* infected with *P. falciparum* were fed on four volunteers whose blood had been examined daily for a month and found to be free from malaria parasites. The incubation period varied from 12 to 14 days. Small ring forms appeared in the blood before the initial rise in temperature. Crescents were observed 7 to 13 days later. Crescents persisted for 40 days even after atabrin and quinine treatment. For four days after their first appearance crescents were not infective for *A. stephensi*; thereafter till the 26th day they were highly infective. From the 27th to the 40th day they again became non-infective. A host who has recovered from the initial infection is not immune against reinfection with the same strain. N IV

CHOPRA (R. N.) & BASU (B. C.) Studies on the Effect of Anti-Malarial Drugs upon the Infectivity of Patients to Mosquitoes. Part III. Prontosil. —*Jl Malaria Inst of India* 1939 June Vol 2. No 2. pp 153-154

Five hundred and eleven laboratory bred *A. stephensi* were fed on five crescent carriers before and after the administration of prontosil in various doses. As large a dose as 40 tablets failed to devitalize the crescents which developed to the sporozoite stage in a considerable proportion of mosquitoes. N IV

SINTON (J. A.) HUTTON (E. L.) & SHUTE (P. G.) Proseptasine as a True Causal Prophylactic in Malignant Tertian Malaria.—2 mimeographed pp. League of Nations. Health Organisation. Malaria Commission. C.H./Malaria/271 Geneva 1939 Jan. 24

This appears to be an account of the work already abstracted in this *Bulletin* 1939 Vol 36 p 925. N IV

FIELD (J W) & LE FLEMING (H.) The Morphology of Malarial Parasites in Thick Blood Films. Part I. The Thick-Film Morphology of *Plasmodium vivax*.—*Trans Roy Soc. Trop Med. & Hyg* 1939 Jan 28. Vol 32. No 4 pp 467-480 With 5 figs. & 2 coloured plates.

This paper is the first of a series describing the appearance of human malarial parasites in thick films. It deals with *P. vivax* and in two coloured plates are arranged side by side the various stages in thin films and in thick films. The technique of preparing the films is described, while the various departures of the different stages of the parasite from the normal owing to this technique are carefully discussed. A study of the paper and the very instructive plates will enable any one to identify in thick films any stage of the parasite under observation.

C M Wexon.

DE BURCA (B.) Note on Anti-Malaria Measures in Quetta Cantonment during 1938.—*Jl Malaria Inst. of India*. 1939 June. Vol 2. No 2. pp 121-130. With 8 figs. on 4 plates, 1 map & 2 charts.

Of 7735 anophelines captured in Quetta Cantonment in 1938 89 per cent. were *A. stephensi* 6 per cent. *Anopheles* 2 per cent. *culicifacies* and 1.4 per cent. *stephensi*. The low prevalence of *culicifacies* contrasts with the findings of previous years when this species was much more in evidence. Nearly all anopheline breeding takes place outside cantonment limits. *stephensi* is a large mosquito with a longer range of flight than either *culicifacies* or *stephensi*. In one area where large numbers of *stephensi* were found in July the nearest breeding place was 1½ miles distant. This does not explain however the rarity of *culicifacies* the larvae of which were very seldom found anywhere.

The control measures adopted are described. A local fish, *Dicogasterichthys rosenus* var. *subventris* Berg was found, experimentally to be as efficient as Gambusia in destroying larvae and pupae. This is interesting as this fish has its mouth on the ventral surface and so is a bottom feeder. Spraying barracks was regularly carried out with apparently satisfactory results. The spray used was Pyrethroid 20 one part kerosene oil, 19 parts.

Malaria incidence among the troops was much lower than in previous years and was highest in June and July two months earlier than usual.

N IV

SIXTON (J A.) Immunity or Tolerance in Malarial Infections.—*Proc Roy Soc Med* 1939 Sept Vol 31 No 11 pp 1298-1302 (Sect Comp Med pp 60-54)

An interesting summary of existing knowledge and current speculation regarding malarial immunity. Two factors are involved in this immunity an antiparasitic element whereby the parasites are kept at such a level that few or no clinical symptoms develop and an antitoxic element neutralizing hypothetical toxins. The defensive mechanism is cellular and humoral. The cellular factor is the phagocytic activity of the macrophage system. This is at first non-specific and sluggish but later becomes very active and specific, if the

host survive. The antibodies are probably produced by the macrophage system as a result of the stimulation of ingested parasites. The specific humoral factor has probably the nature of an opsonin. The existence of antitoxic substances would explain the fact that early in the infection a small number of parasites produces a much more severe reaction than does a much larger number later in the attack.

The author discusses and compares natural resistance and acquired tolerance. The tolerance found among a large proportion of the indigenous population of highly malarious areas is given as an example of natural resistance or immunity. Premunition is described. The residual immunity found after infection with *P. falciparum* is more fleeting than that left by malarial infections. The residual immunity following *P. ovale* infections appears to be the most durable. A II

SINTON (J. A.) A Summary of our Present Knowledge of the Mechanism of Immunity in Malaria.—*Jl Malaria Inst of India*. 1939 Mar. Vol. 2. No 1 pp 71-83 [15 refs.]

This paper covers the same ground as the above but in less condensed form. N II

SINTON (J. A.) Studies in Immunity in Malaria. Part VI. The Effect of Drugs upon the Development of Immunity and its Relationship to the Principles of Treatment.—*Jl Malaria Inst of India* 1939 June. Vol. 2. No 2 pp 191-216 With 1 chart [42 refs.]

The early part of this paper records observations upon *P. knowlesi* infections in young non-immune rhesus monkeys with special reference to factors determining the rate at and the degree to which immunity develops. The effects of treatment on the intensity of the parasite prevalence and on its duration and the period of infection at which therapy is started are both important. The amount of antigenic stimulation or parasitic intensity and the duration of such stimulation determine the degree of immunity acquired and the rate of its acquisition. The bearing of these observations on the divergent views held regarding malaria treatment is discussed. The author enunciates general principles regarding the treatment of malaria in different conditions.

When infections are contracted by individuals resident under conditions in which the chances of reinfection, except at comparatively long intervals, are slight, the treatment of choice is one which produces a radical cure of the infection at the earliest possible moment.

When individuals are resident under conditions where they are exposed to frequent and constant risk of infectious reinfection and superinfection the object of treatment should be the rapid production of a clinical cure of each attack, and not a radical cure of the infection.

When individuals are exposed only temporarily to chances of frequent infection and superinfection, then clinical prophylaxis of the disease with an appropriate drug is the treatment of choice. A II

WOLFF (E. K.) Buffer Precipitation Test (B. P. T.) for Malaria.—*Trans Roy Soc Trop Med & Hyg* 1939 Apr 6 Vol. 32. No 6 pp 707-716 With 4 charts.

The simple test described is a development of Chorine's modification of Henry's test for malaria. Chorine's determination of the distilled

conclusion that this view is untenable and that EE forms can arise from parasites which have developed in the red blood corpuscles, because in 70 per cent. of the infections resulting from blood inoculation EE forms do not appear till after the acute phase has passed.

C M IV

MAXWELL (Reginald D) *Toxoplasma* or *Exoerythrocytic Schizogony* in Malaria?—*Riv di Malarologia* Sez. I. 1939 Vol. 18. No. 2. pp 76-88 With 19 figs. on 4 plates. [33 refs.]

The presence of exoerythrocytic schizonts in bird malaria infections has led to the suggestion that in such cases there have been double infections with malarial parasites and *Toxoplasma* and that the schizonts represent developmental forms of the *Toxoplasma*. In this paper the author examines the evidence for and against this view and concludes that it must be considered unlikely that the exoerythrocytic forms represent a mixed infection. Before a final answer can be given, however he thinks that further experimental work will be necessary. It is noted that these schizonts have now been found in association with five distinct species of bird malarial parasites.

C U IV

MAXWELL (Reginald D) & GOLDSTEIN (Frederick) The Asexual Life Cycle of the Avian Malaria Parasite *Plasmodium curviflexum*.—*Science* 1939 Feb 10 N. S. Vol. 89. No. 2302. pp 131-132.

In this note the authors record the discovery of exoerythrocytic schizonts in four strains of *Plasmodium curviflexum* in canaries. It is noted that these stages occur most commonly just after parasites first appear in the peripheral blood and that they frequently occur in localized areas in great numbers. The possible relationship of these schizonts to *Toxoplasma* is discussed without any definite opinion being expressed, though it is pointed out that *Toxoplasma* usually if not always, reproduces by binary fission.

C M IV

LUCENA (Duvál) *Malaria aviana* II *Plasmodium cathemerium* Hartman 1927 parasite do tico-tico (*Brachyryza pileata*) e do pardal (*Passer domesticus*) e *Plasmodium elongatum* Huff, 1930 parasite do tico-tico, em São Paulo. III Da presença dos *Plasmodium praecox*, *P. nucleophilum* e *P. ranghoni* em passeros de S. Paulo (Avian Malaria. II. *P. cathemerium* Parasite of the Tico-tico and the Sparrow *P. elongatum* Parasite of Tico-tico in S. Paulo. III. *P. praecox*, *P. nucleophilum* and *P. ranghoni* Present in Birds of S. Paulo.)—*Folia Med* 1938, July 15 & Dec. 5. Vol. 19 Nos 20 & 34 pp 233-238. [15 refs.] English summary pp 404-406. [13 refs.] English summary

In the first of these long papers the author records the discovery of *Plasmodium cathemerium* in the tico-tico (*Brachyryza pileata*) and the sparrow (*Passer domesticus*) from various points of South America. In the tico-tico from S. Vincent *P. elongatum* was found. The former parasite was inoculable to canaries.

In the second paper it is recorded that *P. nucleophilum* was found in the sparrow and both *P. ranghoni* and *P. praecox* in *Turdus ruficollis* and *T. leucocollis*.

C M IV

MEHON (T Bbushara) The Visceral Lesions in Simian Malaria, with Special Reference to the Splenic Reaction.—*Trans Roy Soc Trop Med & Hyg* 1939 Jan 28 Vol. 32, No 4 pp. 481-495 With 8 figs on 4 plates [61 refs]

A histopathological study of the organs from 12 monkeys which died of *Plasmodium knowlesi* infection has shown that a vascular mechanism is responsible for the localization of large numbers of parasites in the spleen in which there is a lymphoid reaction and activation of the reticulo-endothelial system as evidenced by histiocyte differentiation and active phagocytosis. The severity of infection in these animals is not due to failure of the reticulo-endothelial response but to some other factor which may be the virulence of the parasite for this particular host. A toxic factor is suggested by degenerative swelling of the capillary endothelium with necrosis of the cytoplasmic reticulum round the follicles. C M II

RODHAIN (J) & MUYILE (G) Sur la spécificité des *Plasmodium* des anthropoïdes de l'Afrique centrale [Specificity of the *Plasmodia* of the Anthropoids of Central Africa].—*C R Soc Biol* 1939 Vol. 131 No 15 pp 114-117

The authors relate how in previously recorded experiments they have failed to infect human beings with *Plasmodium schweileri* the malarial parasite of the chimpanzee which resembles *P. vivax* of man. The reverse experiment of infecting the chimpanzee with *P. vivax* was once successful in the hands of MESNIL and ROUBAUD. In this case typical parasites were present for nine days. There seemed however to be a possible fallacy in this experiment for the injection of human blood might have stimulated a latent *P. schweileri* infection. The authors of the present paper have repeated the experiment of inoculating *P. vivax* to a chimpanzee. After forty-six days blood inoculated to two general paralytics produced typical *P. vivax* infections after incubation periods of fifteen and eighteen days. The inoculated chimpanzee was known to have a *P. reichenowi* infection and possibly a latent *P. schweileri* infection also. During the forty-six days both *P. reichenowi* and a form which might be either *P. schweileri* or *P. vivax* were observed in the blood. The fact that *P. vivax* infections were produced in man proved that the parasite can survive in the chimpanzee for at least forty six days. C M IV

HELMINTHIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

FAUST *et al* (p 62) compared 11 techniques for the diagnosis of protozoa or helminths in faeces. Two were direct faecal films the others had strained faeces as a basis. They conclude that a combination of direct film with zinc sulphate centrifugal floatation is to be recommended for the clinical laboratory and in epidemiological surveys. SWARTZ WELDER (p 62) found that zinc sulphate centrifugal floatation revealed the largest numbers of protozoa and helminth infections, but faeces were strained through gauze before using the method. SAWITZ

et al (p. 62) for *E. vermicularis* infections prefer the NIH swab to any method in which faecal examinations are made. Details may be found in the abstracts concerned. In comment LANE points out the inadvisability of straining faecal suspensions and the desirability of enumeration of organisms in the comparison of techniques. NITZULIESCO *et al* (p. 65) propose to use the Hamburg technique after a comparison made with others but LANE criticizes their work on the ground that the techniques were not carried out according to the instructions given by the originators and that the Hamburg technique was not used to the best advantage.

STARKOFF (p. 65) gives details for the preparation of platyhelminths. VOGEL and RIOT (p. 67) give a table of over 150 000 stool examinations performed in French colonies. HOFFMAN and JAXER (p. 67) report findings in Porto Rico and NITZULIESCO and NITZULIESCO (p. 68) in a region near Jassy.

The clinical and pathological features of renal damage due to poisoning by carbon tetrachloride are described by SMETANA (p. 68). Discussing anthelmintics SKILLIE (p. 68) points out the danger of oil of chenopodium and advises the use of hexylresorcinol. HARE and DUTTA (p. 69) compared tetrachlorethylene with oil of chenopodium, controlling the results by DCF and found the former to be the more effective. It is also cheaper. SWALES (p. 68) found phenothiazine to be effective and non-toxic in experiments on sheep. C II

- I. FAUST (Ernest Carroll) SAWTIZ (Willi) TONIE (John) ODUM (Nada) PERES (Charles) & LENCICOME (David R.) Comparative Efficiency of Various Techniques for the Diagnosis of Protozoa and Helminths in Feces.—*Jl. Parasitology* 1939 June Vol. 25, No. 3. pp. 241-262. With 3 figs. 14 refs.]
- II. SWARTZWELDER (J. C.) A Comparison of Five Laboratory Techniques for the Demonstration of Intestinal Parasites.—*Jl. Trop Med & Hyg* 1939 July 1 Vol. 42, No. 13. pp. 185-187. With 2 figs & 1 plate.
- III. SAWTIZ (Willi) ODUM (Nada L.) & LENCICOME (David R.) The Diagnosis of Oxyurias. Comparative Efficiency of the NIH Swab Examination and Stool Examination by Brine and Zinc Sulfate Floatation for *Enterobius vermicularis* Infection.—*Public Health Rep* 1939 June 30 Vol. 54 No. 26. pp. 1148-1158. With 2 figs. [20 refs.]

These three reports come from New Orleans.

I. A report on further work notified as in progress [this *Bulletin* 1939 Vol. 36 p. 144]. Its aim was the ability to recommend a technique or techniques for displaying intestinal infections with protozoa and helminths which should be simple and more dependable than those used in the diagnostic laboratory and the authors add that their study warrants a fulfilment of that promise.

Examination was made of 271 fresh faecal specimens coming from 242 persons, 214 being investigated once, 27 twice and 1 three times, and in these examinations eleven techniques were compared, and are quoted below by the numbers given to them in this paper. Two of them are direct faecal films. No. 1 spread faeces on a slide in normal saline over an area of 40 x 20 mm. put at once a coverglass over half and stain the rest with d. Antoni's iodine stain before putting another cover over it. No. 4 spread plain faeces on a slide fix in hot

Schaudinn and stain with Faust's iron haemoxilin. In a third No 2 spread out 20 cmm of a 1 in 5 suspension (which had been strained through a layer of cheese cloth with 31 meshes to the linear inch) after diluting it with an equal quantity of normal saline and prepare the film as in No 1. The other eight use as a basis a 1 in 5 faecal suspension made by mixing 5 grams of faeces with 10 cc of normal saline. This mixture is forced gently through a brass sieve with 40 meshes to the linear inch and is then washed through with other 10 cc of normal saline. No 3 put 20 cmm of this suspension on a slide dilute with an equal quantity of normal saline and prepare as in No 1. No 6 dilute on a slide 10 cmm of the suspension with 10 cmm of fresh human serum and treat as in No 4. No 6 put 1 cc of the suspension in a calibrated Wassermann tube of unstated dimensions add tap water to 1 inch from the top centrifuge and decant repeat the washing precipitation and decanting twice and then add d Antoni's iodine solution to the 2 cc. mark. No 7 treat 2 cc of the suspension as in No 6 except that the Wassermann tube of unstated dimensions is not calibrated and repeat the washing and centrifuging till the overlying fluid seems clear then by tapping mix the last precipitate with a little zinc sulphate solution having a specific gravity of 1.180 fill the tube to within 0.5 cm of the top using the same solution and centrifuge. By a medicine dropper add more of this fluid drop by drop near the wall of the tube till a convex meniscus forms touch this but not the tube with a slide reverse this last so that the preparation becomes uppermost add one drop of d Antoni's iodine and cover. No 8 follow No 7 to the centrifuging in the zinc sulphate solution but collect the eggs by passing a bacteriological loop vertically down one side of the [necessarily concave] meniscus withdrawing it horizontally full of the surface fluid placing this on a slide repeating this collecting procedure twice and staining as usual. In No 9 2 cc. of the basic 1 in 5 suspensions were centrifugalized and floatation was accomplished as described in Technique 7. Approximately 5 cmm of fresh human serum were introduced on to a 25x75 mm slide and a loopful of material from the [presumably convex] surface film of the Wassermann tube placed directly on it and treated as in No 5. No 10 is an arbitrarily modified D.C.F. effected by pipetting 2 cc. of the suspension into a Wassermann tube of unstated dimensions having a ground top water is added to within 1 cm of the top then follows centrifuging and decanting repeated till the overlying fluid is clear when the tube is filled with saturated sodium chloride solution (s.g. 1.200) a round cover laid on it which is held in place by 4 metal fingers and the tube is centrifuged once more the cover is then transferred to a broad slide, but the real technique is not further modified by the staining which every other one gets. No 11 is as No 10 with the exception that the floating fluid is zinc sulphate solution of s.g. 1.180 that the round cover-glass was carefully removed from the top of the tube with sharp vertical lift and inverted stained as usual a broad slide superimposed and the whole reverted.

In Table 1 which presumably refers to 271 faecal specimens it is seen that Techniques 1 2 and 3 discovered respectively 345 337 and 332 and in all 427 protozoal infections. In 189 specimens all examined by techniques 1 to 10 the total number of protozoal infections was 486 and of helminthic ones 58. The respective figures were No 1 219 4 No 2 221 3 No 3 228 4 No 4 294 3 No 5 186 1 No 6 224 6 No 7 361 43 No 8 366 50 No 9

227 8 No 10 0 48. As to No 11 no figures are given, it merely being said —

"The first 73 specimens were examined by all three of these techniques but the findings for protozoa indicated that the touch and loop methods had the same practical efficiency as the superimposed coverglass removal. Hence, in all subsequent examinations, Technic II was discontinued since it required specially prepared Wassermann tubes and metal support in order to carry out the modified Lane technic and since it was more laborious than the other two methods. However in case of a quantitative study of either protozoan cysts or helminths' eggs, our data (1-10) indicate the greater accuracy of the superimposed coverglass method.

"Because of simplicity in operation and high efficiency of yields for both intestinal protozoa and helminths, a combination of the direct fecal film (either iodine-stained or hematoxylin-stained) with zinc sulphate centrifugal flotation (either by touch-removal or preferably by loop removal) is recommended for the clinical laboratory and in epidemiologic surveys.

The centrifuge used throughout was the "International Clinical Centrifuge" in which the distance from the axis to the bottom of the tube is 13.5 cm. Centrifuging was for 45 seconds at a top speed of 2,640 revolutions per minute.

ii. The first technique was No 1 of (i). In the others were used a 1 in 5 faecal suspension which had been filtered through two layers of "gauze" and of them the second, third and fourth used a precipitate from 3 cc of the suspension obtained by centrifuging in water for 4 to 60 seconds at 1,500 revolutions a minute in a Wassermann test tube measuring 100 by 13 mm.

In the second technique the precipitate is washed, reprecipitated, suspended in an equal quantity of d'Antoni's solution and a drop examined. The third with the exception of the amount of suspension and speed of centrifuging is as No 7 of (i) but it is noted that the film is removed without delay after the meniscus has been made convex. The fourth is as the third except that saturated salt solution (s.g. 1.200) is used instead of zinc sulphate solution (s.g. 1.180) — it is called "Brin" (direct) centrifugal flotation, but it is not D.C.F. and any effect of staining was again not noted. The fifth is by gravity precipitation of "approximately 10 cc of the suspension" in a culture tube measuring 150 by 16 mm. It is stood for an hour the supernatant fluid poured off and washing and standing repeated till the overlying fluid remains clear a large drop of the final sediment is stained with iodine and examined. In all, 319 individuals were examined by all five methods. The positive findings for protozoa, which included *E. coli*, *E. histolytica*, *E. nana*, *I. bilischni* and *G. lamblia* were respectively 63, 75, 85, 0, 76. Those for helminths which included *A. lumbricoides*, *T. trichiura*, *V. americanus*, *H. nana* and *S. stercoralis* were 7, 9, 22, 19, 19. The zinc sulphate centrifugal flotation method revealed the largest number of both protozoa and helminth infections.

In Anal scraping was by the NIH swab and with that were compared direct centrifugal floatations using the washed centrifugal precipitate of a 1 in 5 faecal suspension strained through a brass screen with 40 meshes to the linear inch and floated respectively with saturated common salt solution and with the same zinc sulphate solution as above.

1. An incidence of 89.3 percent infection with *Enterobius vermicularis* has been found in an institutionalized group of 136 white children in New Orleans.

2. The incidence in 109 boys was 86.3 percent that in 27 girls was also 86.3 percent.

3. One hundred and thirty-one children were examined by the NIH swab method and their stools were examined simultaneously by the brine and zinc sulfate centrifugal floatation techniques. The superiority of the NIH swab technique is shown by the fact that the first swab examination detected an incidence of 71.8 percent whereas stool examinations by brine and zinc sulphate floatations detected an incidence of only 13.7 and 17.6 percent, respectively.

4. Repeated swab examinations up to 7 times, each revealed additional infected children. Further examinations on the remaining negative children were negative thus supporting the view that at least 7 swab examinations are necessary before the absence of pinworm infection is assured.

[In connexion with these three papers the reviewer has in hand one suggesting that the use of a strained faecal suspension is not equivalent to that of an unstrained one that the mere discovery of infective organisms in place of their enumeration when present is not a sound basis for comparing the accuracy of techniques and that the relative failure of a substitute DCF one altered in essential details without control is a rather unsatisfactory measure of the value of the DCF itself.]

Clayton Lane

NITULESCO (V.) MAHOILESCO (C.) & POROVICI (R.) Sur la recherche des oeufs d'helminthes par la méthode de Willis-Hung [Search for Helminth Eggs by the Willis-Hung Method.]—*Bull Acad Méd Roumanie* 1939 4th Year Vol 7 No 2. pp 88-99

The Hamburg method of faecal worm-egg concentration by gravity floatation [HUNG this *Bulletin* 1927 Vol. 24 p 195] is compared with those of TELEMANN of 1908 and of DE RIVAS [this *Bulletin* 1928 Vol 25 p 447]

In no case did these authors carry out the instructions of the originators of the techniques under test so that their work does not in fact evaluate these techniques. They made no independent egg counts to serve as controls. In using the method which they name the Willis-Hung technique more commonly referred to perhaps as the Hamburg technique they made their examinations 2 $\frac{1}{2}$ and 3 hours after the eggs had been set to float. GUILLINI it will be remembered [this *Bulletin* 1932, Vol 29 p 37] showed that the numbers of *Ascaris*, *Trichuris* and hookworm eggs that remain floating in saturated salt solution after an hour has passed is remarkably lessened. They believe on unstated grounds that their stock solution was a saturated one [that is that it had a specific gravity of just over 1200] but they certainly used for floatation a four fifths saturated solution [which has a specific gravity of about 1160 and in fact floats relatively few *Ascaris* or *Trichuris* eggs]. We propose the systematic employment of the Willis-Hung method in all research on helminth eggs in stools so as to control and eventually complete the results obtained by the usual chemical methods (Telemann or [de] Rivas) C. L.

STARKOFF (Oleg) Nuovi metodi per la preparazione di platelminti. [New Methods of preparing Flatworms.]—*Boll Istituto Sieroterap Milanese* 1939 Apr Vol. 18. No 4 pp 218-224 With 2 figs. on 1 plate French summary (4 lines)

For trematodes fix in 70 per cent alcohol put in 10 per cent caustic potash solution for 10 to 60 minutes or more according to

227 8 No 10 0 48. As to No 11 no figures are given, it merely being said —

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The centrifuge used throughout was the "International Clinical Centrifuge" in which the distance from the axis to the bottom of the tube is 13.5 cm. Centrifuging was for 45 seconds at a top speed of 2,640 revolutions per minute.

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iii. Anal scraping was by the N.I.H. swab and with that were compared direct centrifugal floatations using the washed centrifugal precipitate of a 1 in 5 faecal suspension strained through a brass screen with 40 meshes to the linear inch and floated respectively with saturated common salt solution and with the same zinc sulphate solution as above.

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Results of Stool Examinations in French Colonies during 1937 [see p 67 VOGEL & RIOU]

	Number of stools examined	Flagellates	Ascaris	Hookworms	Trichinae	Enterobius	Strongyloides	Taenia
Dakar	3 672	247	386	255	63	19	91	107
Senegal	1 555	2	39	29	8	—	10	7
Sudan	406	14	1	20	5	—	1	1
Niger	203	0	31	42	4	—	—	1
Ivory Coast	811	38	90	278	63	6	13	19
Dahomey	2 401	87	307	345	128	38	218	19
Guinea	2 310	82	247	405	78	27	37	358
Togo	23 845	161	3 418	2 865	48	174	118	33
Cameroon	52 018	1 712	36 721	25 033	13 107	1 825	239	721
French Equatorial Africa	35 653	—	8 109	8 374	4 900	486	1 017	3
Madagascar	44 328	77	3 083	965	1 301	272	202	102
Indo-China	17 335	2 013	9 837	4 684	8 660	0	318	167
New Caledonia	1 420	134	28	254	215	2	52	0
New Hebrides	170	0	41	41	41	3	8	0
Guadeloupe	737	0	247	295	354	0	74	0
Martinique	3 521	118	85	300	747	13	3	0
Guiana	2 884	48	246	1 029	185	7	0	0

size wash for half to one hour stain to a diffuse orange in VAN GIESON'S picrofuchsin (if the earlier washing had been insufficient fine crystals form on the surface) decolorize in 70 per cent alcohol till the yellow background disappears and the alimentary canal and genitalia stand out in red dehydrate in 90 per cent alcohol pass into xylol and mount in balsam

For cestodes fix in Bouin for 12 hours wash in running water for an hour or two stain for 2 to 4 hours in a saturated solution of light green [verde-luce] in 95 per cent alcohol treat in glacial acetic acid for 2 to 4 hours wash in running water for some hours but do not let decoloration of the edges begin put in 10 per cent caustic soda for some seconds until all is decolorized except the uterus wash rapidly in abundant running water counter-stain with borax carmune for some seconds wash rapidly in water dehydrate compress between 2 slides in 70 95 and 99 per cent alcohol pass through xylol into balsam
C L

VOGEL (E) & RIOU (M) Les maladies épidémiques endémiques et sociales dans les colonies françaises pendant l'année 1937 Parasitisme intestinal [Epidemic, Endemic and Social Illnesses in French Colonies during 1937]—*Ann de Méd et de Pharm Colon* 1939 Apr Vol 37 Supplement pp 413-425

The figures above (p 66) for the different countries mentioned are comparable if perhaps the methods of examination were in all cases the same though that is questionable, and is at least unstated.

In addition there were reported from Senegal 1 *D caninum* and 2 *H nana* from French Equatorial Africa 227 *S mansoni* and 242 *Diphyllbothrium* and from Indo-China 296 *C sinensis* C L

HOFFMAN (W A) & JANER (J L) A Parasite Survey of Isabela.—*Puerto Rico Jl Public Health & Trop Med* 1939 June Vol 14 No 4 pp 439-444 With 1 chart [Spanish version pp 445-449]

Since schistosomiasis incidence was the primary consideration diagnosis in great part had to be made by the concentration method. Each sample was examined four times twice with smears of salt solution and Donaldson's iodine twice with concentration (upper surface and sediment)

By these often indefinite methods hookworm infection was detected in 50.2 per cent. of males between 16 and 20 this being the maximum *Ascaris* had its maximum of just under 60 per cent between 1 and 5 years old *Trichuris* is probably the most ubiquitous parasite in Puerto Rico and it is not surprising that higher rates obtain for this species unfortunately they are not mentioned. Scarcely one per cent of the individuals studied harboured ova of *Schistosoma mansoni* *Fasciola hepatica* occurred once in a young woman 7052 samples having been examined. Eggs of *Heterodera radicicola* were found in 76 samples of *Trichostrongylus* in 1 of apparently a spuriid, perhaps a phylloptera, in 8. *Entamoeba coli* was frequent *Endolimax nana* came second among the protozoa In comparison with surveys from many other regions, the figures given for *E histolytica* seem quite low The paper does not give more definite statements than those indicated above.
C L

VITULESCO (V.) & VITULESCO (G.) Contributions à l'étude de l'helminthiase intestinale dans la région de Jassy [Intestinal Helminths about Jassy].—*Bull Acad Med Roumanie* 1939. 4th Year Vol. 7 No. 2 pp. 100-103.

In 1060 faeces from different persons examined microscopically by an unstated method, probably a smear the main infections found were *Trichuris* 34.53 and *Ascaris* 12.77 per cent. The eggs of *Dicrocoelium dendriticum* were present in 3.74 per cent. but they were eggs swallowed in food, for when a second examination could be made after control of the diet the eggs were never found, nor in those examined was there any evidence of hepatic disease.

It is added that in the dissecting room cysticercosis has been found 4 times in the last 3 years but never more than 2 or 3 to a body.

C. L.

SMETANA (Hans) Nephrosis due to Carbon Tetrachloride.—*Arch. Intern Med* 1939 Apr Vol. 63. No. 4 pp. 760-777 With 5 figs. [51 refs.]

"In addition to hepatic damage carbon tetrachloride poisoning sometimes causes alarming renal symptoms, such as oliguria or anuria, nitrogen retention and subsequent hypertension. The urine contains albumin, white blood cells, red blood cells, casts and bile.

"The anatomic basis for the clinical renal symptoms is nephrosis characterized by distention of the spaces of Bowman with albuminous precipitate, with swelling of the lining cells, swelling and vacuolation of the cells of the proximal convoluted tubules, degeneration and necrosis of the cells of the distal convoluted tubules and those of the loops of Henle with desquamation, and by the presence of granular hyaline and cellular casts in the tubules, with plugging of their lumina. Concretions are present whose nature and significance are obscure.

These conclusions are based partly on the literature and partly on 3 cases seen at the Presbyterian Hospital, New York, within the last year. One took an unknown quantity of the drug by mouth and died and the two others had used it for cleaning and one of them died. In the two that died, central necrosis of the liver lobules was marked. There was a tendency to bleeding in all. The histories and clinical and pathological changes are given for all.

C. L.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1939 July 29 Vol. 113. No. 5 pp. 410-415.—The Use of Anthelmintics.

A discussion on anthelmintics in New York was initiated by Janet TRAVELL along stereotyped lines. SMILLIE, with his great experience, made a valuable contribution from which these are extracts. We have been looking for the ideal vermifuge for a long time but it has never been discovered. Once you have seen a person die of oil of chenopodium poisoning you hesitate ever to give it again. It is a terrible death. Carbon tetrachloride may also be quite toxic.

I have had two deaths, however from the drug and here again it is a devastating experience. He accordingly advised the use of hexylresorcinol and touched on other matters familiar to readers of this Bulletin.

C. L.

HARE (K. P.) & DUTTA (S. C.) The Comparative Value of Oil of *Chenopodium* and Tetrachlorethylene as Anthelmintics for Use in Mass Treatment—*Indian Med Gaz* 1939 Apr Vol 74 No 4 pp 198-201

As tested by D C F tetrachlorethylene in a dose of 4 cc. cured a ten times higher percentage than did oil of *chenopodium* of guaranteed B P strength given in a dose of 30 minims the former is the better drug on all counts considered by the writers

The choice of an anthelmintic for mass treatment will fall on one which is non toxic reasonably palatable easily dispensed effective in one dose and inexpensive. An assessment of value made by comparing the percentage of worms expelled by the drug under test with the estimated worm load is held unsatisfactory. Unworming should be the test and D C F its basis used at a sufficient interval after the drug. The investigation now reported compared the effect of oil of *chenopodium* in single doses of 20 or 30 minims with tetrachlorethylene in single doses of 4 cc. given in the morning to fasting in patients it being certain that all the dose was swallowed. If it came up again it was repeated.

Oil of <i>chenopodium</i>				Tetrachlorethylene	
20 minims		30 minims		4 cc.	
Total cases	Percentage cured	Total cases	Percentage cured	Total cases	Percentage cured
17	0	84	4.8	87	48.3

In the tea garden coolies view *chenopodium* is unpleasant to take while tetrachlorethylene is sweet to taste pleasant to smell does not burn the mouth and produces an enjoyable if slight drunkenness. A weak woman of 18 suffered after tetrachlorethylene from severe vomiting giddiness and drowsiness but was well by evening. This drug is about half the cost of oil of *chenopodium* C. L.

SWALES (W. E.) Tests of Phenothiazine a Highly Efficient Anthelmintic. On a Means of Administration and the Indicated Uses for the Control of Parasitic Diseases of Sheep—*Canadian J. Comp Med* Gardenvale Quebec. 1939 July Vol. 3 No 7 pp 188-194

Phenothiazine has it is reported been described as comparatively non toxic for pigs sheep rats rabbits and humans. Ten experiments in which it was given to sheep are described worms passed in the faeces and collected at autopsy being compared, with satisfactory results and no toxic symptoms. Its efficacy was increased by mixing in the bolus bicarbonate of soda and tartaric acid whose effervescence particulated it and so aided solution of a little soluble drug. It was given in doses from 1 gram to 0.3 gram for each pound for body weight. C. L.

- JONES (A.) & WOLTER (H.) Ueber die Verwendbarkeit von Pyrethrum als Anthelminticum. [Pyrethrum as an Anthelmintic.]—*Klin. Woch.* 1939 June 24 Vol. 18, No 25 pp 833-889 With 2 figs.

MISCELLANEOUS

- LAMBERT (S. M.) East Indian and Fijian in Fiji their Changing Numerical Relation.—*Bernice P Bishop Museum Spec. Publication* 32 Honolulu Hawaii, 1938 14 pp With 9 graphs.

The author discusses the principal causes of the depopulation of native countries in contact with white civilization and while giving due emphasis to the effect of decay of native custom and maladjustment to changed environment points out that the introduction of diseases to which the natives have no immunity is, from the numerical point of view the greatest cause of the decrease in population in Fiji. The ill effects of the commercial exploitation of the natives have largely been removed by British administration.

Of the imported diseases, epidemics of dysentery influenza pneumonia, measles, smallpox and tuberculosis are the most destructive the latter accounting for 25 to 34 per cent of the annual deaths.

The native population declined from 200 000 in 1870 to just over 87 000 in 1905 rose to 91 000 in 1917 and after reaching the low point of 82 000-83 000 after the influenza epidemic of 1918, rose to 98 291 in 1936. A graph shows that the crude birth rate has remained almost level since 1891 but the crude death rate has fallen fairly steadily and the gradual fall can almost be measured in terms of expansion of medical effort.

Comparisons may be made between the native Fijians and the East Indians living in Fiji. The birth rate per 1 000 females is higher in the Indians, but steadier and showing a tendency to rise in the Fijians. The birth rate in females of child-bearing age is more than 25 per cent. higher in the Indians than in the Fijians. The age group in which there is the greatest death rate is 0-4 years.

The author contrasts the Indians, survivors of thousands of generations exposed to every disease, now living in an ideal climate under vastly better economic conditions and practically free from the handicaps of caste, with the natives decimated by imported disease and disconcerted by white civilization but still showing the will to survive. As yet the Fijians preponderate numerically but the author poses the question as to the probable outcome of the increase in the Indian population.

Every opportunity for making the Fijians health-conscious should be exploited through the cooperation of the Departments of Education and Medicine and should rest upon the approach of native medical personnel to the native general population. [That this procedure is now actively employed is evident from the reports of HOODLESS and MCGURRY this *Bulletin* 1939 Vol 36 p. 843.]

AIGUIER (C.) Djanet (Pays Ajjer) Etude géographique et médicale. [Djanet (Ajjer Country) A Study of its Geography and Diseases.] —Arch Inst Pasteur d'Algérie 1938. Dec Vol 16 No 4 pp 533-587 With 1 map 2 diagrams & 6 plates. [Refs in footnotes]

A detailed study of this remote oasis in the south-east corner of the Southern Territories of Algeria at 24°N and an elevation of 3 900 feet

In this oasis, where the author spent two years the temperature ranges from 16 to 35°C in the hot season and from 5° to 18° in the cold. Rain is a rare event the fall in 1935 was 5 mm but the subsoil is rich in water. The population numbers 1,300. The people their habits and living conditions houses diet are fully described. They wash neither their bodies nor their clothes and the body louse hives on them in perfect tranquillity.

Passing to the diseases met with *malaria* first appeared in epidemic form in 1928 [the French occupation dates back to 1911] following abundant rain and again in 1933 after another rainy period. In intermediate dry years there were no fresh infections. The *Anopheles* determined at the Algiers Pasteur Institute are *A. hispaniola*, *A. brusseii* and *A. dthali*. They breed in disused wells. The parasite is *P. falciparum*.

The focus of *schistosomiasis* at Djanet the only one known in Algeria was first recognized in 1925 [see this *Bulletin* 1926 Vol. 23 p 474]. The natives have a name for it and know that it is contracted in bathing. The source is probably Tunis or the French Sudan and Niger with all of which caravan communication is frequent. Whereas no case has occurred since 1933 among the troops whose bathing is interdicted it is common among the undisciplined civilians. Of 107 boys between 4 and 16 years 46 per cent were infected and the proportion is probably as large among the girls for all children bathe together. No acute case was seen and the only constant sign is haematuria with pyuria at the end of micturition. In adults a form of rheumatism (joint pains) or pseudo-sciatica was common. The existence of *pulmonary tuberculosis* in the Sahara has been denied but the author says that since the arrival of the French it has progressed rapidly. In this oasis tuberculous infection is still small. Nil in children and adolescents it increases in the adult after the twentieth year especially in males the positives to tuberculin have usually been servants to Europeans or Arabs.

Leishmaniasis, *filariasis*, *trypanosomiasis* and amoebic dysentery are at present unknown. No worms were seen in the stools but the children eat earth, especially a white stone which dissolves in water and is used to whitewash houses. Enterica, undulant fever diphtheria and typhus are also unknown [and presumably relapsing fever which is not mentioned]. Smallpox is kept down by vaccination varicella is not uncommon.

Whooping-cough appeared in 1935. Of 226 cases 87 were in children under two years 83 in those from 2 to 6 and 56 in those between 6 and 15. The death rate in the infants was 19.5 per cent in the intermediates 9.7 and in the older ones 7 per cent. 29 deaths in all. Lung complications were frequent. Many mothers had slight attacks.

Influenza first appeared in 1933 almost the entire population suffered and 90 died. A second epidemic in 1935 was mild. A disease

called "loumet" is described. It has been regarded as measles and as varicella. The author believes it to be rubella but retains the native designation. Seven-tenths of consultations in the oasis are for eye diseases especially trachoma. Other affections do not call for mention.

A. G. Bagshawe

RAYMOND (W. D.) Tanganyika Arrow Poisons. A Medico-Legal Problem.—*East African Med J* 1939 Mar Vol. 15 No. 12 pp. 419-431 With 13 text figs. & 7 figs. on 3 plates. [24 refs.]

This is an interesting account of arrow poisons in Tanganyika Territory. The chief source of these is one or other species of *Acocanthera*, the active principle being a glucoside ouabain. It is prepared mainly in the Lrwale district. Fragments of the wood are boiled with water and the product concentrated to a sticky mass which is smeared on the arrow head. Its toxic effect depends on its entering the circulation, when it may kill in a few minutes, half an hour or so when taken by mouth it has little or no toxic action. The preparation contains some 10 per cent. of the glucoside. The local antidote is a species of *Fadogia*, known locally as *Akalo*. *Strophanthus Adenium* and *Scilla* are also employed for preparing arrow poisons.

The author's study is based on examination of some 40 poisoned arrows. The twisted iron behind the barbs may carry as much as 7 gm. of the poison. The m.l.d. for a cat is stated to be 0.12 mgm. per kilo, which for a 10-stone man would be 7.6 mgm. [not approximately two milligrams, as stated in the text] so the quantity on an arrow if all were injected, would be enough to kill 921 men [not "about 250"]. The toxicity according to native belief may be unimpaired even after several years keeping. [In the list of references no mention is made of the article in BYAM and ARCHIBALD's *Practice of Medicine in the Tropics* where considerable information, including much of that given above on arrow poisons is to be found. See also this *Bulletin* 1936 Vol. 33 p. 634.]

H. H. S.

RAYMOND (W. D.) Native Poisons and Native Medicines of Tanganyika.—*Jl Trop Med & Hyg* 1939 Oct. 2 Vol. 42 No. 19 pp. 295-303 With 2 figs. [50 refs.]

The author continues his interesting notes on the native East African poisons though most of what he tells is gathered from well known sources and one would like to hear more of his personal experiences. In the present paper he remarks on the mixtures more or less objectionable and noxious, given as medicines by the local African doctors which depend for their effects to a great extent on the psychological conditions surrounding or connected with the patient. Some of those named having a local reputation in fever, helminthic infestation, venereal disease are found wanting or inert when tried scientifically.

Mr. Raymond sketches briefly some of the commoner poisons of Tanganyika, dividing them into (1) Delirianta, (2) Ordeal drugs, (3) Fish poisons, (4) Homocidal poisons, (5) Arrow poisons. [This is not a good classification, for the groups overlap and the third includes drugs used for stupefying fish to render them more easily caught and also actual poisonous fish also arrow poisons and ordeal drugs and delirianta can all be used for homocidal purposes.] Among delirianta, alcohol from fermented gram and fruits of various kinds takes an

important place e.g. *Pombe* native beer made from millet contains about 4 per cent by weight of alcohol *tembo* or palm wine 8.5 to 7.4 per cent. *Datura* (*Stramonium*) is classed as a deliriant and at one stage has this effect but it is also an hypnotic used for purposes of robbery [as the seeds can be mixed with curry unsuspected and the patient on waking remembers nothing of what has passed in the interval between the meal and the awakening (see BYAM and ARCHIBALD's *Practice of Medicine in the Tropics* Vol 1 p 777)]. *Cannabis indica* (Indian hemp) is mentioned and *Argemone mexicana* [The author it is hoped will investigate this last more fully for it is incriminated as being the cause of epidemic dropsy when added as an adulterant to mustard oil (see this *Bulletin* 1939 Vol. 36 pp 909-910)] *Erythrophloeum guineense* is described but the active principle is not known with certainty it appears to be an alkaloid and causes vomiting diarrhoea and death by respiratory arrest.

Euphorbia species are used for rendering fish stuporous the stems are beaten with stones and the resultant green mash is placed in open wicker baskets these are immersed and then rotated in the stream for some ten minutes and the men then come out and wait on the banks for about the same period when fish come to the surface dazed and the larger are caught Human beings may be poisoned by drinking the water from pools which have been so treated.

Phytolacca dodecandra contains a bitter glucoside saponins and an alkaloid in leaves and roots and gives rise to nausea vomiting thirst diarrhoea with passage of blood, cyanosis dilation of pupils small irregular pulse and stupor *Courbonia camפורum* is an irritant which may be fatal with intestinal haemorrhages the active principle is not yet known. *Cucumis* (wild melon) contains *cucumisin* ($C_{27}H_{42}O_9$) an amorphous white powder sparingly soluble in water more readily in alcohol it may produce severe gastro-intestinal irritation or in large doses (in animals) sudden death without any characteristic symptoms In Tanganyika patients suffer from violent haemorrhagic diarrhoea. The symptoms of *Dioscorea* poisoning are known (see this *Bulletin* 1938 Vol. 35 p 76) as are those due to *Tetrodon* [not *Tetroden*] and *cantharides* [Among the references the article on Vegetal and Fish Poisoning in BYAM and ARCHIBALD's *Practice of Medicine in the Tropics* is not mentioned though many of the poisons referred to in the present paper are there spoken of] H H S

REVIEWS AND NOTICES.

BRADFIELD (E. W. C.) [Major-General, C.I.E. O.B.E. R.H.S. I.M.S. Director-General Indian Medical Service] *An Indian Medical Review*—pp iii+658. 1938 New Delhi Govt of India Press [Rs. 2-8 or 4s.]

This interesting account of medical progress in India consists of 279 pages of description including numerous useful tables and 360 pages of statistics. It summarizes an immense amount of information in Government of India and Provincial Government medical reports in a convenient form with historical information on the evolution of medical advances in various directions.

The medical profession in India is now placed at between 35,000 and 40 000 only 667 of whom are I.M.S. officers and 740 are medical missionaries. Chapter II deals with Hospitals and Dispensaries and the appendices consist mainly of statistics of them province by province. These tables show the number of beds and patients the cost and the medical and nursing staff including midwives who are so important under the Indian purdah system. Information is given on the modern system of Indian honorary medical officers, who have the highest qualifications. The vexed question of supplying rural medical relief owing to the impossibility of qualified medical men making a living in villages is being dealt with by subsidies. The influence of the Indian Provincial Governments is seen in the efforts to pass legislation to foster the cheap indigenous Ayurvedic and Unani systems of medicine although in a later section it is recorded that a very early support of such schools was abandoned. The same influence is seen in the admissions to medical schools being in some cases on a communal basis, irrespective of the education qualifications of the candidates apart from a fixed minimum. An advance has been made in providing post-graduate teaching for Assistant Surgeons in hospital employ. The mental hospitals in all India only number seventeen. Tuberculosis presents a very serious problem, but for this disease the beds only number 2,768. Hospitals and asylums for leprosy number 78, and the 54 under medical missionary administration alone supply 10,345 beds. In addition there are 1124 leprosy clinics in India, mostly in Madras, Assam and Bengal.

Medical education is dealt with fully in the longest section of 108 pages which includes a historical account of its development. The first medical colleges were opened in Calcutta and Madras in 1835 yet there were only four in India up to 1910 but now there are ten and one for women only with five-year courses, particulars of which are given. The British General Medical Council first recognized Indian University teaching in 1892 but the supervision is now carried out by an Indian Medical Council. Medical schools teaching for a lower grade diploma were also begun over a century ago and there are now no less than eighteen Government and nine non-Government schools. A report of Major-General Spraxton is quoted to show that these schools vary extremely in their standards of teaching, which is for four years, except in three instances with five. Many are not well staffed and a table shows that most of them are deficient in all of the seven standard rules he laid down for them. It has recently been decided to bring the best of them up to the five-year university standard and to close the rest so as to have only one qualifying standard in India. In 1937-38 they had a total of 6 492 students. Military medical students are trained for British military hospitals under a different standard. This education section supplies much valuable information. Shorter chapters show the steadily improving conditions regarding nursing and maternity work in India.

A five page chapter on medical research and the institutions in which it is carried on is of especial interest. After mention of some of the early research workers, the development of research laboratories is traced beginning with the Bombay Plague Research Laboratory in 1899 the Hansell Pasteur Institute in 1900 and the Central Research Laboratory at the same hill station in 1906 a year after the Bacteriological Department (now the Medical Research Department) of the Government of India, was started with 13 officers, since increased to 20.

In 1920 the School of Tropical Medicine and Hygiene was opened in Calcutta and expanded in 1932 by the opening of the Institute of Hygiene and Public Health built at the cost of the Rockefeller Foundation. One-fourth of both the capital cost and the research income of the School of Tropical Medicine was provided by an endowment fund raised by public subscription. In addition to describing these institutions this section summarizes the researches in recent decades under thirteen heads including malaria cholera plague kala azar and leprosy.

The remaining sections deal with medico-legal work pharmacy and drug control including the important quinine policy and the work of various societies such as the Red Cross St John Ambulance the Leprosy Association the anti tuberculosis fund and nursing associations. In addition to a full table of contents the index (so often lacking in Government publications) will be of use to those acquainted with India but anyone seeking information on the Hygiene and Public Health Institute or the Leprosy Association for example will only find it under All India and British India respectively.

Enough has been said to show that this compilation is of great value as a work of reference on medical matters in India and Major-General Bradfield has performed a very useful piece of work in publishing it.

L. Rogers

ROCKEFELLER FOUNDATION INTERNATIONAL HEALTH DIVISION
Annual Report 1938.—233 pp With 24 figs. on 12 plates
New York 49 West 49th Street

In the reviewer's opinion no single book of the size of this report contains so much that is of interest to the investigator and practitioner in the tropics. As a whole it is difficult to review and it cannot be abstracted because like the homoeopaths' mother tincture it is already so concentrated that abstraction would be synonymous with extraction. All interested and this includes most tropical workers should try to obtain a copy and keep it within close reach for reference until the researches therein described have been embodied in the current text-books.

After some remarks on virus studies in general in which stress is laid on the value of the analytical ultra-centrifuge with its optical system for photographing sedimentation and on the refinements in electrophoresis methods and apparatus the report considers discusses and summarizes the work of the year under three main heads (1) Control of specific diseases notably yellow fever influenza malaria and tuberculosis (2) Aid given to central or local departments of health (3) Similar aid to public health education by grants to schools and training centres and fellowships for post-graduates.

Much of what is related under Yellow Fever has been abstracted in this *Bulletin* because the report gathers together the work of its staff or subsidized persons engaged on investigations into this disease most of whom have published the results of their studies. Here however we have the separate pieces brought together into their proper places to constitute the finished picture. A story of the highest interest is told of the early knowledge and development of rural and jungle yellow fever which first led to doubt of the all-efficiency of ridding a country of yellow fever by sanitation of the seedbeds of infection how for the former the programme of

available for diagnosis and a brief summary of clinical signs. In this way is presented a more complete picture of the pathology of the disease than any other single text book affords. The text is illustrated by many excellent original photographs and diagrams and by eighteen very beautiful whole-page coloured plates. The magnification of the former but not of the latter is given.

The subjects selected for detailed study are naturally those of special importance in the tropics. But many others are referred to shortly in the appropriate sections. Thus in the chapter "Diseases due to the genera *Pasteurella* and *Brucella*," plague is considered at length and brief notes on tularaemia, undulant fever melioidosis and glanders follow.

Certain subjects of general application, such as immunity, hypersensitiveness, vaccines and Koch's postulates are discussed in various later sections of the book instead of in the introductory chapters where they would more fittingly appear. The continuity of the text is disturbed by this arrangement. The reticulo-endothelial system perhaps merits a fuller account than that assigned to it. In the section on nephrosis, one feels that for once Dr Smith's lucid style has forsaken him.

Two very useful appendices are given. One in tabular form, on the differential diagnosis of the various inflammatory enlargements of lymph glands, the other on post-mortem technique. The index is full and accurate.

The book is printed in clear type on high-grade paper. The excellence of the illustrations is a pleasing feature.

There must be many pathologists in the tropics who have experienced the author's difficulty in recommending text-books to their students. They will be grateful to Dr. Smith for placing at their disposal, in a work of moderate size and price, a most useful introduction to their subject.

J. B. Darby

TJROOK KIRM BOX. Over trophische spruw en experimentele B₂ deficiënties bij honden en apen. [Tropical Sprue and Experimental B₂ Deficiency in Dogs and Monkeys.] (Thesis for Doctorate of Medicine University of Amsterdam)—164 pp. With 28 figs. & 4 plates [102 refs.] English summary 1939. Amsterdam: Drukkery M. Lindenhout & Co. N. I.

An excellent systematic and detailed account of sprue is given in this thesis with a useful chapter on sprue-like diseases. These cases are essentially clinical. On the experimental side are given the author's researches into the black tongue disease of dogs, which is curable by nicotinic acid and which is now regarded as identical with pellagra. His sprue cases number thirty-five and at the end of each of them he presents a summary of the outstanding conditions which led to the diagnosis of tropical sprue. A composite picture of the features generally prevailing would, on extraction, give the syndrome as—(1) Anorexia and dyspepsia. (2) Fat diarrhoea, with much fat and fatty acids in the fermenting stool and without blood or mucus. (3) Emaciation. (4) Painful glossitis. (5) Hyperchromic macrocytic anaemia, and frequently histamine-refractive hypo- or achlorhydria. (6) Sluggish ankle reflex. (7) Hypocalcaemia with tetany and osteoporosis. (8) Flat blood-sugar curve. (9) Therapeutic betterment with sprue diet, liver treatment and, sometimes

iron or calcium medication. The differential diagnosis concerns itself with pellagra, pernicious anaemia, non-tropical sprue, pancreatic diarrhoea, intestinal tuberculosis, gastro-jejuno-colic fistula, Addison's disease, regional ileitis. In pellagra the presence of symmetrical dermatitis, true psychoses, a deficient dietary, colic and blood in the stools are important features. Routine microscopic diagnosis of the degree and type of fatty diarrhoea is made by mixing on a slide a small quantity of faeces with some drops of the following solution: glacial acetic acid 18, 96 per cent alcohol 2, sudan III 1. The acetic acid converts soaps to fatty acid. The sudan III stains neutral fat and also when the slide is warmed the melted fatty acids. On cooling the unstained fatty acid crystals separate out. In general prognosis in tropical sprue is good. This is a curable disease and the patient can, after cure, be self-supporting, dispense with liver treatment and even return to the tropics.

The author's animal experimental work was based on that of MILLER and RHOADS who obtained in dogs by means of B₁₂-deficient diet chronic relapsing black tongue disease with much similarity to sprue: mouth and tongue symptoms in the form of redness and atrophy, emaciation, diarrhoea and finally hyperchromic macrocytic anaemia. The animals used were 7 young dogs and 2 adult *Macacus* monkeys and the basal diet had the composition: white maize flour 400, ashless casein 60, calc. carbonate 30, sodium chloride 10, salad oil 30, cod liver oil 15. In the diets called I, II, III, IV and V various additions were made to the basal diet. Black tongue disease was caused in 5 out of the 7 dogs. The opportunity is taken to go in some detail into the symptomatology, pathology and therapy of this disease. It could be effectively cured by brewer's yeast or nicotinic acid. An interesting observation was that the hair of two of the dogs turned grey and was not restored to normal during the experiment. Of the two monkeys used one developed on the testing diet a hyperchromic macrocytic anaemia, the other only a temporary macrodiameteria of the erythrocytes.

Embodied in the detailed conclusions are some points worthy of special note:—(1) Amoebic and bacillary dysenteries do not seem to play an aetiological rôle in sprue nor do either a deficient diet or alcoholism. (2) Treatment with a low fat low-carbohydrate high protein and high vitamin diet including liver is nearly always followed by clinical cure. (3) While experimental black tongue and human pellagra may be considered to be closely allied diseases there is little in the pathogenesis of black tongue disease which throws light on the aetiology of sprue.

W F Harvey

[British workers maintain that though osteoporosis is common in non-tropical sprue and sprue-like diseases it is not a feature of true (tropical) sprue and is in fact an important factor in differentiation.—Ed.]

HERMS (W B) *Medical Entomology, with Special Reference to the Health and Well-being of Man and Animals*. Third Revised Edition—pp xix+582. With 196 figs. 1939. New York. The MacMillan Co. [£1 4s 0d]

The present work is the third edition of the author's *Medical and Veterinary Entomology* which was last published in 1923 and is

much used in America. It is dedicated to the late Professor G. H. F. Nuttall, of whom an excellent photograph forms the frontispiece.

The general plan of the book is clear and logical. Introductory chapters deal with the historical development of parasitology, effects of parasitism on host and parasite, types of transmission, etc. The author then gives an anatomical account of Insecta and Arachnida, emphasizing mouth parts. A succession of chapters follows, each dealing with an order or smaller group of insects of medical importance. The book is concluded by discussions on the venoms and the therapeutic uses of arthropods. The balance between the medical and veterinary sides of entomology is well held. An excellent feature of the book is the common-sense sections on such things as "Fleas in the Household".

One might perhaps say that text-books fall into two groups. Some are equally competent throughout and tend to be dull; in others the author shows his own preferences so that parts of the work are particularly good, though it is not very even. The present book comes in the latter class. The author gives an extremely useful and interesting account of relapsing fever in the United States, complicated as it is by the presence of many species of *Ornithodoros*, and by their relationships with numerous sorts of wild rodents. One would turn to Herxler for information on this perplexing subject. He also gives a full account of the entomology of Rocky Mountain spotted fever in the U.S.A. (but nothing to indicate that it occurs elsewhere). His accounts of farm entomology and fly control are also most valuable. But he is much less successful in describing some tropical sides of the subject, among them the entomology of Central African relapsing fever or the biology of *Glossina*.

It is always a matter of opinion as to how space should be distributed in a book. The author's personal interest has led him to give 5 pages to the possibility that *Stomoxys transmuta* poliocephala, though that was ruled out 25 years ago, since when nothing significant has been published. One wonders also why such a family as the Polyctenidae should be included, for they are parasites of bats and nothing else, and in no way related to medicine of man or animals. It might perhaps have been better had space been saved for an account of modern work on the relation of fleas to climate, a subject on which a fairly complete picture is now available. Modern work on the control of the bed bug is another subject which would merit fuller treatment.

The wording is sometimes careless or misleading. For instance, the author says that "probably all species of vertebrate animals are subject to attack by ticks," a view that could hardly be supported even if terrestrial vertebrates are intended; and again "40 per cent. formaldehyde is poisonous like wood alcohol if taken internally".

P. A. BURTON.

TROPICAL DISEASES BULLETIN

Vol. 37]

1940

[No. 2.

SUMMARY OF RECENT ABSTRACTS *

II YELLOW FEVER

Distribution and Epidemiology

JAMES (pp 19-631) gives figures from S. America and Africa of cases and deaths for the year ending 30th September 1938. In British Guiana suspected jungle yellow fever has been reported; positive protection tests have been obtained with sera from the Sudan and it is possible that the disease may be present in Abyssinia. FINDLAY (p 633) also shows that the endemic area in Africa extends to Abyssinia and that there is serological evidence of the occurrence of yellow fever in the Malakal region during the last 5 years. O'BRIEN (p 21) reports 81 cases from the Gold Coast and SOREL (p 21) records a distinct increase in the number of cases found in 1937 in French W. Africa—48 were reported.

SOPER (p 633) shows that rural yellow fever (transmitted by *Aedes aegypti*) and jungle yellow fever (transmitted in the absence of *Aedes aegypti*) are responsible for maintaining non-urban endemicity in S. America, with the result that anti *Aedes* measures in seed beds of infection failed to eradicate the disease from Brazil.

Protection tests—In the *Bulletin de l'Office International d'Hygiène Publique* (p 23) it is pointed out that the only real value of the mouse protection test is for making a retrospective diagnosis in a community suffering from an epidemic of uncertain nature when the number of positives is well above that of the surrounding population.

The test is recognized as specific by the great majority of workers (DINGER p 23) but BOYÉ (p 25) disputed its value in a discussion in connexion with the patients from the *Sea Rambler*. CLERC and STEFANOPOULO however did not agree with Boyé. SCHÜFFNER (p 634) agrees that the mouse protection test is specific and uses a 10 per cent (instead of 20 per cent) suspension of virus for the detection of small quantities of immune bodies. VAN DEN BERGHE (p 641) uses a 20 per cent suspension and dilutes the serum 1/7. He describes

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

the technique adopted for the test on batches of mice. PELTIER (p 650) discussing the specificity of the test, points out that of 117 sera from natives in Dakar born before the epidemic of 1927-71 were positive whereas of 100 born after the epidemic none was positive.

CROUCH (p 21) reports that 12 of 27 sera from the Nubian Mountains gave positive protection tests. In Ruanda Urundi, VAN DEN BERGHE (p 634) found no positive protection tests but VAN CAMPEKHOUT (p 23) found one positive in 50 tested.

In the report of the INSTITUT PASTEUR OF BRAXAVILLE (p 632) it is shown that sero-protection tests were given by the blood of 5 cattle in the Tchad region and one monkey of 11 tested in the Congo gave a positive test (VAN DEN BERGHE p 634).

In spite of the fact that no epidemic of yellow fever has been reported in Paramaribo Surinam since 1908 SCHUFFNER *et al* (p 22) found positive protection tests in 25 of 233 sera of those living there since 1908 (but not before). This is therefore not easy to explain, but may be due to small epidemics. In 60 who lived there before 1908 34 were positive. These authors found no positives in 85 inhabitants of the Netherlands but 4 of 6 persons in Amsterdam who were in daily contact with the virus gave positive tests.

DA FONSECA and ARTIGAS (p 652) have investigated the susceptibility of a large number of wild animals in Brazil. For details the original abstract should be consulted. The same authors (p 653) found young cats to be susceptible and DA FONSECA (p 653) shows that a small rodent *Ctenomys brasiliensis* is highly susceptible to neurotropic virus.

Jungle yellow fever—SOPER (p 631) thinks that the 250 deaths which took place in Brazil during the first part of 1938 indicate at least 15 000 cases of yellow fever all the cases in S America in that year were of the jungle type transmitted in the absence of *Aedes aegypti*. He (p 633) details the countries in which it is found, and states that in S Brazil it occurs as a wave-like phenomenon. BAUER (p 20) finds that jungle yellow fever may give rise to well marked epidemics but the mode of transmission is still obscure. SOPER (p 21) confirms the importance of jungle yellow fever in S America. It is widely distributed and is associated with increased mortality among howler monkeys and protection tests on numerous wild animals support the view that monkeys constitute the most important factor in spread. Viscerotomy is invaluable in discovering cases.

SCHUFFNER *et al* (p 25) found that 16 per cent of a group of Indians and bush negroes in Surinam among whom no epidemic of yellow fever had occurred showed immunity which is attributed to the jungle form. Jungle yellow fever is an epizootic capable of transmission to man.

FINDLAY (p 633) shows that in Africa as in S America, immunity is found in 20-25 per cent of wild monkeys in endemic areas, but in Africa only the Barbary ape (living in a non-endemic northern area) reacts to infection with well marked clinical symptoms whereas in S America some species are very susceptible. True jungle fever has not yet been found in Africa.

Adiology

FINDLAY and MACCALLUM (p. 635) record spontaneous variation in a neurotropic strain which between the 670 and 750 passages in mouse brains before which it had regularly produced neurotropic symptoms

in monkeys began to produce death with the characteristics of the pantropic strain. HINDLE emphasizes the extreme importance of this finding and of the regular testing of the pathogenicity of strains used for human immunization. SCHÖFTNER *et al* (p 636) show that substrains of the Dakar strain maintained since 1928 alternately in *M. rhesus* and dried *in vacuo* and also by continued subinoculation in mice have remained true to type. Dried virus kept in sealed tubes from which the air had been removed was fully virulent after 5 years.

DE ASSUNÇÃO (p 33) by means of protection tests has demonstrated the essential identity of a São Paulo jungle strain and a neurotropic strain from Dakar. Similarly at the Institut Pasteur at Brazzaville (p 632) the identity of the Brazza and the Dakar strains has been established.

Neurotropic virus of the Asibi strain was found by DA FONSECA (p 636) to persist in the testes of guinea pigs inoculated by that route for periods up to 43 days.

HÖRIG (p 636) has established the fact that yellow fever virus is inactivated by exposure to solutions of urea. This effect depends on the concentration of urea, the dilution of the virus and the duration of contact. In human blood although the amount of urea is not more than 30-40 mgm per 100 cc in febrile cases this action cannot entirely be denied since the urea is in contact with the virus for considerable periods.

SALEUN *et al* (p 32) have isolated a strain of yellow fever virus in French Equatorial Africa for the first time thus furnishing conclusive evidence of the existence of the disease in that region.

NICOLAU (p 635) regards the virus of yellow fever as a small visible coccus giving his reasons but HINDLE points out that the author ignores the fact that filtration experiments have shown the size of the virus to lie between 18 and 27 μ approximately one tenth of the limit of resolution of the visual microscope.

TRANSMISSION

SALEUN (p 632) in French Equatorial Africa points out that it is necessary to abandon the old view that the cycle of infection is man-Aedes-man that there is probably an animal reservoir and that there is probably some other insect vector though when the disease is once established in man *Aedes aegypti* appears to be responsible for the development of typical epidemics. FINDLAY and MACCALLUM (p 638) suggest that other arthropods may play a part in transmission in seasons when mosquitoes are rare. Monkeys may be infected by introducing material into the stomach in the abdomen of the cockroach *Blattella germanica* the virus may remain active for 15 days at 19°C. monkeys eat these cockroaches. It would be interesting to determine what animal foods monkeys use in nature in yellow fever areas.

PATIBO CAMARGO (p 25) names 5 vectors by bite in Colombia — *Aedes aegypti*, *Aedes scapularis*, *Aedes taeniorhynchus*, *Aedes fluviatilis* and *Culex fatigans* (occasionally). Others are infective if triturated and injected. BENNETT *et al* (p 639) have proved that *Aedes triseriatus* a nearctic mosquito ranging throughout the Eastern U.S.A. is an efficient vector but there is some evidence of attenuation of the virus in it.

SHANNON *et al* (p 27) have proved that in nature *Aedes leucocelaenus* and *Haemagogus capricornis* are vectors by bite of jungle

yellow fever in Brazil. Injection of an emulsion of the latter and also of Sabethine mosquitoes also produced infection.

KUMM and NOVIS (p. 28) studied the habits of the mosquitoes found in a jungle yellow fever area in which *Aedes aegypti* was not found.

Although *Aedes geniculatus* kept at 30-35°C. is capable of transmitting yellow fever by bite, ROUBAUD *et al.* (p. 638) failed to effect transmission when the mosquitoes were kept at 20-22°C. though the virus survived in their bodies.

SHANKOV (p. 639) gives advice on methods for collecting and feeding mosquitoes in jungle yellow fever studies.

Pathology and Clinical Findings.

SCHUFFNER *et al.* (p. 25) in Surinam found no distinction between jungle and classical yellow fever in respect of pathological anatomy and serology.

LLOYD (p. 31) points out that histological diagnosis of viscerotomy specimens requires careful attention by a skilled observer and inclines to the opinion that a diagnosis on this evidence alone should not be accepted as final. All outbreaks should be checked by blood surveys. DA ROCHA LIMA (p. 29) emphasizes that histological diagnosis should not be made on any single character alone such as hyaline necrosis but on a careful consideration of the evidence produced by a number of changes in the cells.

MOXTENEGRO (p. 641) defines the Councilman-Rocha Lima cell. It shows coagulative necrosis with a well marked edge surrounded by a narrow clear halo. The cytoplasm is eosinophilic, non-granular, more refractile than normal and contains small vacuoles. The nucleus is reduced in size and is homogeneous, staining a deeper red than the cytoplasm. The cell is rarely binucleate. He describes other cells which may resemble this cell.

TIBIRICA (p. 29) discusses the jaundice of yellow fever. At first it is haematogenous. Later when the cells are damaged, it is hepatogenous or a mixture of the two.

STEVENS (p. 640) examining the brain and spinal cord of patients dead of yellow fever found the principal lesion to be perivascular haemorrhage. Nerve cell changes were slight and there was no evidence of neurotropism in this series.

SCHUFFNER *et al.* (p. 25) though unable to distinguish between the pathological changes in jungle and classical yellow fever in Surinam, state that clinically jungle fever is milder. It is not a serious disease and may easily be overlooked. It is probably responsible for the immunity found in the younger people of Paramaribo where no epidemic of the classical disease has been recorded recently. Jungle fever is an epizootic capable of transmission to man in whom it may be a slight or masked infection.

VAN CAMPENHOUT (p. 22) describes the clinical features of an epidemic of what might have been yellow fever at Zongo in the Congo. Proof of the identity of the disease was not found but precautionary measures were taken. JADIN and ARNALDI (p. 642) discuss this outbreak and point out that the application of anti-mosquito measures and anti-yellow fever vaccination was followed by disappearance of the epidemic and they therefore consider it to have been atypical yellow fever.

Vaccination

With regard to the duration of immunity after yellow fever vaccination it is the view of the Yellow Fever Commission (p. 648) that a definite opinion cannot yet be given. PELTIER (p. 650) has investigated the persistence of protective bodies after vaccination with phosphate and egg-coated vaccines over a period up to 4 years and concludes that it may be advisable to revaccinate every two years. SOREL (p. 21) recommends the testing of the blood one month after vaccination to determine the degree of immunity acquired and one year later to test its persistence. The Yellow Fever Commission (p. 23) makes a similar suggestion.

JAMES (p. 20) reports on immunization with a single inoculation of neurotropic virus attenuated by culture suspended in 0.25 to 0.5 cc homologous serum. SAWYER in Brazil has reported on 80,000 persons thus vaccinated, without the occurrence of any complications and FINDLAY on 4,300 in London before proceeding to yellow fever countries, none of whom contracted the disease although 34 non-vaccinated Europeans in the same areas became infected. BAUER (p. 20) shows that reactions took place in 10 per cent of 200,000 persons vaccinated in Brazil by this method but no jaundice or deaths occurred. Immune bodies were present in 95 per cent after one month and had not diminished a year later.

Of the 4,300 persons vaccinated by FINDLAY (p. 20) 2.9 per cent contracted jaundice probably through the presence of a virus in the serum used. The use of a new strain of culture virus in 1,100 vaccinations has not resulted in any cases of jaundice. FINDLAY and MACCALLUM (p. 30) discuss the 69 cases of jaundice which occurred in 3,100 persons vaccinated with virus in immune serum. The average period before development of jaundice was 2 to 3 months. They suggest as the cause either a hepatotoxic virus introduced with the virus inoculum or a combination of a hepatotoxic substance in the serum and an infective agent which is probably that of common infective hepatic jaundice. In further discussion of this subject FINDLAY *et al.* (p. 651) advise that pools of apparently normal human serum should not be used for human inoculation unless the medical history of all donors can be followed for at least one month.

SMITH *et al.* (p. 648) give an account of virus 17D (originally from the virulent Axihi strain) which is now maintained in tissue culture of fowl embryo from which the brain and spinal cord have been removed to obviate neurotropism. In addition to tests for sterility each batch is tested for any enhanced or viscerotropic properties or neurotropism. Rehydrated vaccine is used and the quantity of virus varies between 500 and 11,000 m.l.d. for mice. Circulating virus may be found in the blood from the 4th to the 10th day, antibodies are formed within 28 days and are usually present for a year. Reactions are mild.

SOPER (p. 20) reports on the use of pantropic virus 17D cultivated on fowl embryo tissue. Slight reactions may be seen and small quantities of virus may be found in the blood between the 4th and 10th days. Complete protection was found in 42 of 45 persons studied after inoculation. For inoculation the tissue culture strain is inoculated into fowl embryos within the egg shell, these are incubated for some days and the embryos are then ground in normal human serum to make a 10 per cent suspension dried and stored in ampoules. The virus must be alive at the time of vaccination and the dried virus should

therefore be tested. A similar recommendation is made by the Yellow Fever Commission of the Office International d'Hygiène Publique (p. 23). This method gives a higher concentration than is obtained in the tissue cultures.

JAMES (p. 632) reports on almost one million vaccinations with virus 17D. Reactions are slight and protection is afforded to at least 80 per cent of those vaccinated. In London 3,500 have been immunized with this virus without the occurrence of any jaundice.

Repeated experiments have convinced PELTIER *et al* (p. 637) that the use of neurotropic virus for vaccination does not involve any risk of infection of the general population even where *Aedes* is common. WHITMAN (p. 637) as a result of tests on man and monkeys finds that there is little if any danger of the transmission of virus 17D by *Aedes aegypti* although the virus was present in the blood at the time of biting. The Yellow Fever Commission of the Office International d'Hygiène Publique (p. 23) point out that although a virus not attenuated by prolonged culture may appear in the blood and be transmitted by *Aedes aegypti* a cultured virus such as 17D has a very attenuated virulence, and attempts to transmit it by mosquito have failed. Mass vaccination may be the only practical measure of prophylaxis in a jungle population. JAMES (p. 632) agrees with this view.

SOPER (p. 633) suggests that the populations of the larger towns of West Africa, which are potentially dangerous centres for spread of infection, should be immunized.

The vaccine strain prepared by the Rockefeller Institute is the Asibi strain attenuated by prolonged cultivation in media containing fowl embryo tissue. DOROVAN (p. 650) reports that reactions may occur after a week but are slight.

VAN CAMPENHOUT (p. 22) reports severe reactions in 13 of 30 Europeans vaccinated with Laigret's vaccine (a suspension of infected mouse brain mixed with egg yolk, see this *Bulletin* 1933 Vol. 32, p. 890). In natives reactions were generally much less severe.

ARAGÃO (p. 26) reports that over 8,000 vaccinations were performed in the State of São Paulo during a small epidemic. There were no serious reactions and the outbreak ceased.

Control

In Brazil, SOPER (p. 633) shows that control is based on viscerotomy, anti-*Aedes aegypti* measures and vaccination. DINGER (p. 23) considers that the only feasible preventive measure in the Dutch East Indies at present is a survey of *Aedes* breeding places, since the introduction of virus for vaccination and for mouse protection tests is prohibited by law.

In America (p. 646) there is now a rule that persons flying from potential or actual foci of yellow fever must be kept under surveillance for 6 days. Persons vaccinated or otherwise immune are exempted.

Park Ross (p. 643) MACKIE and CRABTREE (p. 32) and the *Lancet* (p. 31) describe the Larmuth spray unit (operated by CO₂ from a sparklet bulb) and the Phantomyst electrically driven nebulizer for use in spraying insecticide solutions in aircraft in flight. Dieldrin, an aqueous base extract of pyrethrum, non-inflammable, non-staining, non-corrosive and not objectionable, is used with very satisfactory results, but Aircraft Pyagna is quicker more reliable and gave 100 per cent kill on trial.

Park Ross (p 643) details the procedures taken to disinsectize seaplanes arriving at Durban. This should be done by skilled persons and can be effected within 10 minutes. CUMMING (p 647) gives a detailed list of possible mosquito harbourages on aircraft which cannot be further abstracted

C Hilecks

YELLOW FEVER

PRÉCIS OF ABSTRACTS IN THIS SECTION

JAMES (p 88) summarizes the world notifications for the 6 months ending 31st March 1939. Infected localities and deaths are fewer but jungle fever remains a serious problem in S. America. Vaccination and revaccination with virus 17D are continued without the development of delayed jaundice. SOREL (p 89) reports on the French African colonies and states that it is becoming more and more evident that vaccination affords a sure method of prevention.

BABLET (p 89) discusses the viscerotomy findings in the French colonies in which 44 per cent of the specimens examined were positive. Although in healthy persons the usual medicinal doses of carbon tetrachloride are not likely to produce lesions resembling those of yellow fever in diseased livers this may not be so.

O BRIEN (p 90) reports 15 fatal cases from the Gold Coast.

The Yellow Fever Commission (p 90) records an increase in positive protection tests in Malakal where clinical yellow fever is unknown and *Aedes aegypti* is practically non-existent. Vaccination with virus 17D is recommended and the importance of viscerotomy stressed.

SNEATH (p 90) records evidence which leads to the opinion that the yellow fever of British Guiana is of the jungle variety. If this were allowed to encroach on the coastal belt conditions there would favour its spread.

RUSSELL (p 91) reviews the question of the possible introduction of yellow fever into India.

The value of vaccination by 3 injections of phosphate vaccine or one of egg-coated vaccine is demonstrated by VOGEL and RIVU (p 91). PELTIER *et al* (p 92) have shown that neurotropic virus can pass through the scarified skin and is capable of giving rise to positive protection tests when mixed with smallpox vaccine and applied in the usual way. They propose to apply this method on a large scale in natives.

FINDLAY and MACCALLUM (p 93) have infected monkeys by introducing virus into their stomachs through a catheter but with other animals the method failed. Human volunteers who swallowed virus 17D showed no subsequent immune bodies probably owing to the destructive action of the gastric juice. The same authors (p 93) report on spontaneous development of yellow fever in two laboratory monkeys and although the method of infection is not known it may have been through the agency of cockroaches, ants or other arthropods.

A baboon inoculated intracerebrally with a neurotropic strain by VAN DEN BERGHE (p 94) showed liver changes and virus recovered

from the liver showed viscerotropic qualities although that recovered from the brain remained neurotropic.

In the opinion of POWERS and HEADLEE (p 94) the lethal effect of petroleum oil on eggs of *Aedes aegypti* is due to a coating of oil on the chorion which causes oxygen starvation. The authors have tested 28 oils and name the most efficient. IMBRASCIATI (p 95) discusses preventive measures in relation to aircraft serving Africa. C II

- i JAMES (S P) Renseignements concernant la fièvre jaune reçus au cours des six mois se terminant le 31 mars 1939 [Information on Yellow Fever received during the Period of Six Months ending March 31st, 1939.]—*Bull Office Internat d'Hyg Publique* 1939 June Vol 31 No 6 pp. 1044-1047
- ii SOREL (F P J) Les cas de fièvre jaune dans les Colonies Françaises d'Afrique en 1938. [Cases of Yellow Fever in French African Colonies in 1938.]—*Ibid* pp 1048-1052
- iii BAHLET (Jean) Contrôle histologique de la fièvre jaune dans les Colonies Françaises au cours des années 1937 et 1938. [The Histological Control of Yellow Fever in French Colonies during 1937 and 1938.]—*Ibid* pp 1053-1059
- iv O'BRIEN (A. J R.) La fièvre jaune en Gold Coast et en Nigeria pendant l'année 1938. [Yellow Fever in the Gold Coast and Nigeria during 1938.]—*Ibid* pp 1060-1062
- v VAN CAMPENHOUT (J) Modifications à la technique du test intrapéritonéal de protection antiamarille de la souris. [Modifications in the Technique of the Intraperitoneal Yellow Fever Protection Test in Mice.]—*Ibid* pp 1063-1064
- vi BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE 1939 June Vol 31 No 6 pp 1065-1067—Rapport de la commission de la fièvre jaune [Report of the Yellow Fever Commission.]

1. Cases of yellow fever notified during this period are indicated in the following table —

South America

Country	State or District	No. of localities with cases	No. of cases	No. of deaths
Brazil	Rio de Janeiro	2	—	2
	Esperito Santo	12	—	44
	Minas Geraes	3	—	8

Africa.

Belgian Congo		1	1	—
French Equatorial Africa	Upper Sangha	1	1	1
	Tchad	1	1	1
French West Africa	Ivory Coast	10	15	8
	Niger	1	1	—
	Sudan	3	3	2
British West Africa	Ivory Coast	3	3	3
	Nigeria	7	9	5

Comparing the period in question with the similar period last year there has been a fall in the number of infected localities from 97 to 44 and in the number of deaths from 190 to 74. No more urban cases have been recorded from South America but jungle yellow fever remains a serious problem.

Vaccination seems the only practical method of protection at present and in 1938 the number vaccinated (with virus vaccine 17D) was 1 059 292.

In London 7 000 have now been vaccinated before proceeding overseas 3 000 with culture virus 17D and no cases of delayed jaundice have been observed in the latter. Antibodies have been found to persist in many cases 4 to 7 years after vaccination but in 40 per cent of the cases antibodies disappeared within 2 years. Re vaccination has been applied in 200 cases without any reaction being observed.

ii During 1938 the number of recorded cases of yellow fever was only 24 as compared with 48 in 1937. There were 18 cases with 16 deaths among Europeans 4 cases among Syrians and 2 natives. Details are given of epidemiology of the various cases all of which presented typical symptoms. One of the two deaths recorded from French Equatorial Africa occurred in a camp of the Mining Company of Eastern Oubangui at Sasso and was a case of rural yellow fever. No connexion with any other cases could be established. The results of serum protection tests on 24 inhabitants of Gabon were all negative except in one very doubtful case in which there were febrile symptoms suggestive of yellow fever. Ten sera from Birao on the Anglo-Egyptian Sudanese frontier gave 7 positive and 1 doubtful. None of these yellow fever patients had been vaccinated. As time goes on it is becoming more and more evident that vaccination affords a sure method of protection.

iii The results of the histological examination of 142 specimens of liver obtained by viscerotomy in French Colonies during 1937 and 1938 are indicated in the following table —

Country of Origin	No examined	Positive	Negative
Antilles (Martinique Guadeloupe)	4	0	4
French West Africa	104	54	50
Senegal	50	28	22
Ivory Coast	24	14	10
Sudan	16	10	6
Dahomey	7	2	5
Guinea	6	0	6
Mauritania	1	0	1
French Equatorial Africa	34	9	25
Cameroons	10	1	9
Gabon	12	4	8
Middle Congo	6	2	4
Oubangui-Chari Tchad	6	2	4

The proportion of positive cases is thus 44 per cent as compared with 24 per cent of the specimens examined in 1935-1936. Seven of the cases included children 4 below 10 years of age all of whom showed typical hepatic lesions. One patient who had been vaccinated

against the disease 2 years previously died with symptoms suggestive of yellow fever but the histological examination showed none of the typical changes. A month later his wife died of yellow fever with typical histological changes but the author considers that it is unjustifiable to assume that the two were connected in any way.

Various examples are given of the use of this method of diagnosis for checking the results of clinical observations, including cases showing fatty degeneration of the liver cells but without the typical necrosis.

Experimentally the author finds that there is little likelihood that a medicinal dose of carbon tetrachloride even if repeated or doubled, is capable of producing in healthy subjects hepatic lesions identical with those of yellow fever [see also this *Bulletin* 1939 Vol. 38 p. 831]. But in the colonies the natives are rarely free from some other infection. Diseased organs are not able to withstand the action of toxic agents in the same way as healthy ones and may develop lesions resembling those of yellow fever except that pyknotic nuclei are present. The most difficult cases to diagnose are those with recent cellular lesions superimposed on a condition of chronic hepatitis.

iv During 1938 in the Gold Coast there were 18 cases of yellow fever all fatal as compared with 75 in the previous year. Four out of the five European cases were engaged in road work which shows the risk of living in rest camps or similar places where mosquito control is impracticable.

Details are given in tabular form of the various cases occurring in Gold Coast and Nigeria in the period in question.

v See this *Bulletin* 1939 Vol. 36 p. 641

vi The Commission considered five special questions. In Malakal the proportion of natives whose blood gives positive protection tests has risen from 0 to 18 per cent. in 4 years (Atkey). Yet in this period there has not been a single clinical case of yellow fever and *Aedes aegypti* is practically non-existent. The Commission await the results of further tests in this and adjoining territories.

It is considered that the use of virus vaccine (17 D) can be recommended for mass vaccination as the amount of virus circulating in the blood is too small to infect mosquitoes feeding on vaccinated subjects. The great value of prophylactic vaccination has been confirmed on a large scale in many districts. Viscerotomy for the diagnosis of cases of yellow fever is indispensable both in endemic and silent zones.

With regard to epidemiology in the Belgian Congo a monkey *Colobus polykomos* caught at Niangala, gave a positive protection test in a region where the sera of a considerable proportion of the natives also contained yellow fever antibodies. [See also this *Bulletin* 1939 Vol. 38 p. 634]

An index of the prevalence of *Aedes aegypti* in the various African countries, has now been prepared and will be of great practical value especially from the point of view of quarantine regulations. Its periodic publication is recommended.

E Hindle

SLEATH (P. A. T.) Yellow Fever in British Guiana.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939 July 28. Vol. 33. No. 2. pp. 241-252. With 1 map.

An interesting account of the yellow fever problem in British Guiana where, in spite of the fact that only one case of the disease

(in 1909) has been recorded during the past 48 years there is a wide spread immunity against yellow fever in the interior

In 1934 by mouse protection tests an examination was made of the blood of 169 persons from four coastal communities. 122 under 15 years old were all negative whilst only 4 out of the remaining 47 were immune. This would seem to justify the conclusion that the inhabitants of the coast have not been exposed to infection for at least 15 years.

In March 1938 a commission studied the Rupununi District and out of 46 sera collected 6 gave positive protection tests although *Aedes aegypti* was never found.

Subsequently by the help of travellers 289 additional blood samples have been obtained mainly from aboriginal Indians in nine principal localities of which Rupununi furnishes two. Out of 246 males 118 or 47.9 per cent were immune whilst out of 43 females only 8 were immune.

The extent of exposure is thus not common to both sexes and this fact together with the epidemiology suggests that the disease involved is the jungle variant of yellow fever. The major foci of infection may be the forested regions of northern and central Rupununi, but there is reason to believe that sources of infection are more widespread. Special precautionary measures are necessary to prevent the introduction of the jungle virus into the vulnerable coastal belt where conditions would favour its spread.

In a postscript the author records the results of the examination of 6 males and 8 females from the Essequibo river. Of the males 5 were immune the youngest only 3 years old. Of the females 6 were immune the youngest 5 and 6 years of age.

E H

RUSSELL (Alexander J H) A Note on the Yellow Fever Position.—*Jl Malaria Inst of India* 1939 June Vol. 2, No 2, pp 115-120

A general review of the present position of yellow fever with special reference to India and the Far East. It is pointed out that the African endemic and silent areas must be looked upon with equal suspicion and an account is given of the quarantine measures to ensure against the introduction of infected mosquitoes by aeroplanes. Karachi is the airport of entry in India for all air traffic coming from the west and the aerodrome there has now been made anti-amaryl. Provision has also been made for the segregation of suspected or infected persons arriving by air in a mosquito-proofed isolation hospital.

It is pointed out that the Government of India is alive to the danger of the introduction of yellow fever and every possible step is being taken to ensure the avoidance of such a catastrophe.

E H

VOGEL (E.) & RIOU (M.) Les maladies épidémiques endémiques et sociales dans les colonies françaises pendant l'année 1937. Fièvre jaune. [The Epidemic Endemic and Social Diseases in French Colonies during 1937. Yellow Fever]—*Ann de Méd et de Pharm Colon.* 1939 Apr Vol 37 Supplement pp 286-301

A summary of the number of cases of yellow fever occurring in French African colonies during 1937. 41 cases with 37 deaths in French West Africa and 7 cases all fatal in Equatorial Africa.

Observations are given concerning the methods of vaccination by the use of 3 injections of phosphate vaccine or a single injection of egg coated vaccine [See this *Bulletin* 1935 Vol. 32, p. 890]. The results of sero-protection tests on vaccinated persons show that in 65 to 90 per cent immunity develops between the second and third inoculations. In some cases immunity tends to disappear by the end of a year but in more than 75 per cent. is still present and even after two years this percentage hardly diminishes. In French colonies 10 412 persons were vaccinated between 1934 and 1937 inclusive, with only one case of yellow fever occurring amongst them whilst during this period 109 fatal cases of yellow fever occurred in the non vaccinated. The single vaccinated persons who became infected had been vaccinated more than two years previously. The method, although occasionally followed by violent reactions is said to have never provoked a fatal reaction or any permanent disability. E H

VAN DEN BERGHE (Louis). Recherche de l'immunité amarile dans le sérum de pygmées Efé de l'Ituri (Congo belge). [A Study of Yellow Fever Immunity in the Serum of Efé Pygmies from the Ituri (Belgian Congo).]—*Ann Soc Belge de Méd Trop* 1939 June 30 Vol. 19 No 2 pp. 241-242.

The author has examined the sera of 26 pygmies, all more than 50 years old, belonging to the Efé tribe from the Ituri Forest in the neighbourhood of Beni. All the sera were negative for yellow fever immune bodies. E H

PELTIER (M) DUBREUX (C) JOYCHÉRI (H.) & ARQUÉ (E.) Pénétration du virus amaril neurotrope par voie cutanée. Vaccination mixte contre la fièvre jaune et la variole (Note préliminaire). [The Percutaneous Penetration of Neurotropic Yellow Fever Virus. Mixed Vaccination against Yellow Fever and Smallpox. Preliminary Note.]—*Bull Acad Méd* 1939 May 9, 103rd Year 3rd Ser Vol. 121 No 17 pp. 657-660.

The authors tested the capacity of a neurotropic strain of yellow fever virus (French strain at its 238th passage) to pass through the skin.

The vaccine was first tested by being applied to the scarified abdomen of 2 rhesus monkeys. They both showed virus in the blood from the 4th to 8th days inclusive and 30 days later their sera were strongly positive although no febrile symptoms ever developed.

Six human volunteers 4 white and 2 negro were similarly infected by applying the filtrate of a suspension of infected mouse brain. In 5 of them virus appeared in the blood and all developed antibodies against yellow fever.

The authors then proceeded to test a mixture of neurotropic yellow fever virus with smallpox vaccine to see whether vaccination against both diseases could be performed simultaneously. This was successful in 4 rhesus monkeys and subsequently was tried on 741 human subjects without any accident. The blood of 388 out of 500 of these patients gave negative protection tests against yellow fever before vaccination, whilst 298 out of 290 tested 6 weeks later were positive.

The authors consider therefore that this is a practicable method for the vaccination of native populations in Africa and its application to 100 000 natives is being authorized. E H

FINDLAY (G M) & MACCALLUM (F O) The Transmission of Yellow Fever Virus to Monkeys by Mouth — *Jl Path & Bact* 1939 July Vol 49 No 1 pp 53-61 With 3 charts

A record of experiments showing that yellow fever virus can infect the Indian *rhesus* monkey and the African guenon *Cercopithecus aethiops* when material containing the virus is administered by means of a catheter passed into the stomach.

Five strains were employed the pantropic French Asibi and Gold Coast viruses neurotropic mouse brain passage virus and the attenuated tissue culture virus 17 D such as is used for human immunization. The material to be administered was made up to 1 cc in a 1 cc syringe connected to a fine flexible catheter which was passed down the monkey's oesophagus and the contents of the syringe injected into the stomach.

Using this method 27 rhesus monkeys were exposed to infection with the above 5 strains and all became infected some dying of yellow fever and others becoming immune.

Only 4 *Cercopithecus aethiops* were available but all became immune after the administration of either pantropic Asibi (1) or French strain virus (3). Virus was present in the peripheral blood for 3 to 5 days after incubation periods of 3 to 5 days.

Attempts to infect 2 dogs 2 rabbits 2 guinea-pigs 4 rats 12 mice 2 hens and 4 pigeons by this method gave negative results. The attenuated tissue culture virus was also given in gelatine ampoules to 6 human volunteers whose blood showed no immunity to yellow fever. The results were negative as serum from these volunteers tested after 3 and 6 weeks showed no immune bodies. This failure to produce immunity in man seems to be correlated with the rapid destruction of yellow fever virus by the acid gastric juice as shown by *in vitro* experiments by Dr MARTIN at the London Hospital for Tropical Diseases [See also this *Bulletin* 1939 Vol 36 p 638.] E H

FINDLAY (G M) & MACCALLUM (F O) Spontaneous Yellow Fever in Rhesus Monkeys in the Absence of Mosquitoes. [Correspondence.] — *Nature* 1939 Aug 19 Vol 144 No 3642 p 332.

The danger of laboratory infection with yellow fever before the development of satisfactory immunization is well shown by the fact that 37 cases among laboratory workers have been reported but in every instance those contracting the disease had been in close contact with infective material.

Last winter 2 rhesus monkeys kept under laboratory conditions at an interval of 71 days developed and died from spontaneous yellow fever. The monkeys were in two separate animal houses. In the case of the first animal no other monkeys infected with yellow fever had been in the same room for more than 3 months while the second animal was in a room where there had been no other infected monkeys for nearly 6 months. No virulent pantropic virus was in use in the laboratory during the period.

The method of infection is at present unknown but human agency can be ruled out since the stock of virulent yellow fever virus is under strict control. Mosquitoes were entirely absent, but monkey lice and rat fleas were found. In addition cockroaches *Blattella germanica* and a small ant *Monomorium pharaonis* were present.

The possibility of any of these arthropods being responsible for the spontaneous infection of the monkeys is at present under investigation. [See also this *Bulletin* 1939 Vol. 36 p 638.] E H

VAN DEN BERGHE (Louis) Mutation et dédoublement du tropisme par inoculation intracérébrale de virus amaril neurotrope à un singe cynocéphale. [Mutation and Dissociation of the Neurotropic, by the Intracerebral Inoculation of Neurotropic Yellow Fever Virus into a Baboon.]—*C R Soc Biol* 1939 Vol. 131 No. 13. pp. 153-158.

A baboon *Papio jubatus* was inoculated intracerebrally with a suspension of the brain of a mouse infected with neurotropic yellow fever virus belonging to the French strain at the 322nd passage. After 7 days it succumbed to the infection and at autopsy its liver was found to contain acidophilic intranuclear bodies. The subcutaneous inoculation of this liver tissue into a rhesus monkey produced a typical viscerotropic infection with death on the 4th day and passage in a second rhesus monkey resulted in an infection fatal on the 11th day.

Mice were inoculated intracerebrally with emulsions of the brain of the baboon or of the livers of the two rhesus monkeys. In the case of the former the mice died of encephalitis on the 5th and 6th day but those inoculated with the virus from the rhesus monkeys died between the 6th and 12th day the usual interval when mice are inoculated with viscerotropic virus.

It would seem therefore that the baboon is a favourable host for the recovery of the virus and also that the properties of the virus are curiously dissociated in this animal, being strongly neurotropic in the brain and viscerotropic in the liver. E H

POWERS (George E.) & HEADLEE (Thomas J.) How Petroleum Oil kills Certain Mosquito Eggs.—*Jl Econom Entom* 1939 Apr Vol 32 No. 2 pp 219-222. With 2 figs.

A record of experiments on the effect of different kinds of petroleum oil on the eggs of *Aedes aegypti*.

The lethal effect seems to depend on the establishment of a coating of oil on the chorion, and the more complete this coating the more quickly the egg dies for the authors show that death is the result of oxygen starvation.

A total of 28 varieties of oil were tested, covering a wide range of physical properties, such as viscosity flash point etc and considerable differences were found in their ovicidal efficiency based on the ratio between the percentage hatch of treated and untreated eggs respectively. On the whole the most efficient oils were those of about 108 viscosity and the best results were obtained with Zircos 40 an oil manufactured by the Standard Oil Company of New Jersey. E H

HÖRNER (Felix O.) Neuere Ergebnisse der Gelbfiebertforschung als Beiträge zur Pathogenese der Viruskrankheiten. [Recent Investigations on Yellow Fever as a Contribution to the Pathogenesis of Virus Diseases.]—*Mitt Hock.* 1939, July 29 Vol. 18. No. 30 pp 1013-1017 [50 refs.]

A general summary of recent work on yellow fever with special reference to its significance in the general problem of virus infections. E H

HÖRING (Felix O) Gelbfieberbekämpfung in Brasilien [The Campaign against Yellow Fever in Brazil].—*Arch f Schiffs u Trop Hyg* 1939 Aug Vol 43 No 8, pp 352-368 With 1 fig [38 refs]

A general account containing nothing new

E H

IMBASCIATI (Bruno) La profilassi della febbre gialla per l'aeronavigazione nei paesi caldi [Prophylaxis of Yellow Fever in Relation to Aircraft].—*Ann d'Igiene* 1939 Aug Vol 49 No 8 pp 542-552. With 1 map

The first part of this paper is a résumé of modern information on the spread of yellow fever especially in relation to air travel which is not new to readers of this *Bulletin*. So far as Italian interests in Africa are concerned the author concludes that the destruction of mosquitoes in towns and aerodromes is not enough but that they must be destroyed effectively in the aircraft by a rapid process capable of application by an unspecialized staff during flight. He points out that owing to the size and poverty of Africa the proper care of aerodromes is difficult and those at present existing do not conform to the requirements laid down by the International Air Convention. Aeroplanes coming from suspected places should be subjected to complete search for mosquitoes on arrival. It would be useful to install mechanical means of protection in all aeroplanes serving Africa and it is important to ensure that no undue delay is caused in air traffic.

[Full details of procedure for disinfection of aircraft are given in this *Bulletin* 1939 Vol 36 pp 643-649]

C H

DINGER (J E) Yellow Fever.—*Bull Colonial Inst Amsterdam* 1939 May Vol. 2 No 3 pp 218-230

HOFFMANN (W H) The Histological Diagnosis of Yellow Fever as an Epidemiological Method.—Reprinted from *Rev Med y Cirug Habana* 1938, Vol. 43 No. 3, pp 155-162.

SENETET (G) & ABONNENC (E) Les moustiques de la Guyane.—IV. Le genre *Aedes*. [Mosquitoes of Guiana. *Aedes*.]—*Arch Inst Pasteur d'Algérie* 1939 Sept. Vol. 17 No 3 pp 467-480 With 8 figs.

TROPICAL DERMATOLOGY

A REVIEW OF RECENT ARTICLES VI *

Chromoblastomycosis.—Since 1931 CARRIÓN¹ has seen seven cases of this disease in Porto Rico. Six of these exactly resembled the usual Brazilian type but the seventh differed clinically although its histological appearances were indistinguishable from those presented by its fellows and the organism proved to be *Hormodendron compactum*.

* For the fifth of this Series see Vol. 36, pp 89-106.

¹ CARRIÓN (A. L.) *Chromoblastomycosis in Puerto Rico*.—*Puerto Rico J Public Health & Trop Med* 1938, Sept. Vol. 14 No 1 pp. 37-71 With 41 figs. on 8 plates. [53 refs.] [Spanish version pp. 72-99]

In the upper part of the leg the eruption was patchy and polycyclic, whilst the more distal areas were coalescent and bore an extensive central zone covered with scales and crusts. The individual nodules were smooth and pink or grey and warty. The leg was markedly oedematous but there was no actual ulceration. Note is again made of one case which showed metastatic foci, the first in which such had ever been noted [published more fully in the *Puerto Rico J. Public Health & Trop Med* 1933 Vol. 9 p. 169]. A full pathological discussion precedes the conclusion that *H. pedrosi* is the name which designates the species most adequately. This fungus *H. compactum* and *Phialophora verrucosa* are closely related, a point which the author has stressed in earlier numbers of the same journal [1935 Vol. 11 p. 114 and 1938 Vol. 12, p. 703].

Victoma—The first example of Madura foot to be noted in Porto Rico is presented by CARRASQUILLO². This occurred in a native workman who had spent many years in a coffee plantation as a bare-footed labourer. When he came under observation he was aged forty-eight and stated that the disease had first appeared between the first and second toes some fifteen years earlier. The left foot was practically doubled in size, the hard swelling involving the whole foot and extending three fingers breadth above the ankle. The skin was dry and scaling and varied in tint from brown to black. There were many nodules in all stages of development their sizes ranging between that of a small pea to that of a hazel-nut. Small white grains were present in the pus. Radiography showed rarefaction of all the metatarsals and phalanges. Amputation was performed and cultures revealed a *Cephalosporium* of a species not yet exactly identified. DUNCAN MARTIN and MURGATROYD³ report a case from Aden, in an East Indian twenty years of age. The lesion had started some twelve months earlier as a papule on the sole of the right foot. When first seen the whole of the foot was swollen but the obvious nodules were restricted to the sole and to a patch behind and below the internal malleolus. X-rays revealed no bony involvement. The fungus was cultivated by removing a piece of tissue and using Caspek's medium, the acidity of which favoured growth in the material. The primary cultures were all white but the subcultures, which grew better on other media, varied in colour some being a deep crimson. The organism was undoubtedly *Actinomyces madures* Vincent.

Piedra—DANG-VAN-NGU⁴ describes a school epidemic of the black variety in Tonking and other cases in Annam. The exact number of the cases are not given but the lesions were all classical in appearance and yielded only *P. hortii* on culture.

Tinea tonsurans—Specimens obtained from one thousand different juvenile cases in Algeria are the subject of another analysis by CATANEI⁵. The great majority of the infections occurred among

² CARRASQUILLO (R. Bazo) Madura Foot in Puerto Rico. Case Report. *Bol. Asoc. Med. de Puerto Rico* 1933 Dec. Vol. 20 No. 12 pp. 45-433. With 5 figs.

³ DUNCAN (J. T.) MARTIN (P. H.) & MURGATROYD (F.). Mycetoma produced by *Actinomyces madures* Vincent [Demonstration].—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939 Jan. 25 Vol. 32 No. 4 pp. 427-431.

⁴ DANG-VAN-NGU. La piedra noire en Tonkin et en Annam.—*Ann. Paras. Humains et Comparés* 1939 July 1 Vol. 17 No. 4 pp. 359-361. With 6 figs. on 1 plate.

⁵ CATANEI (A.). Sur la flore parasitaire des trichophytes en Algérie (d'après détermination de 1,000 champignons parasites).—*Bull. Soc. Path. Ex.* 1939 Feb. 8 Vol. 32 No. 2 pp. 117-120.

Mohammedans but very few were seen in children living in the hills. In the whole series only twelve cases bore a double infection with two varieties of trichophyta and only seven showed a combination with favus. *T. glabrum* was found on 516 occasions, *T. violaceum* on 41, *T. acuminatum* 20, *T. crateriforme* 17, *T. soudanense* 11. Scattered examples were found of the following varieties: *T. fumatum*, *perverum*, *regulare*, *cerebriforme*, *sulfureum*, *placitile* and *umbilicatum*. The same author* has published another paper of the same nature in which the French colonies and mandated territories are concerned but on this occasion he excludes Algeria and Morocco. The list includes 65 trichophyta obtained mostly from the Sudan, Cameroons and Pondichy and 40 microspora from Togo, the Cameroons and Dahomey. *T. soudanense* Joyeux was found 31 times, mostly in specimens from West Africa. *T. violaceum* 20 times, Indo-China being the chief source. Among the remaining specimens there were examples of *T. fumatum*, *T. sulfureum*, *T. rubrum* and *T. gonorrhoideum* Catanei. Among the microspored ringworms *M. obesum* was the most common, being present in 21 cultures whilst *M. andouinii* was found 14 times. The remainder consisted of *M. ferrugineum* and *M. tardum*. *M. obesum* Conant described in very great detail. Microsporon infection of the scalp is rare among the children living in the plains of India but some of these cases have been examined in detail by MAPLESTONE and DRY. Specimens of hair taken from four boys all revealed *M. andouinii* but those taken from six girls (three from Shillong) and one other boy from Calcutta all yielded cultures which were morphologically indistinguishable from *M. ferrugineum* although the yellow tinge was absent from the subcultures. Animal experiments proved negative. In these cases it was possible to see only four personally but these were all between 6 and 9 years of age and the scalp condition was clinically like the ordinary *M. andouinii* infection. This particular fungus would appear to be new to India.

Tinea circinata.—Seven cases have been seen in Tonkin. CATANEI and GRENIERBOLEY* four of them being studied in great detail. Two were caused by *T. rubrum* and two by *T. concentrica*. The latter were classical examples of Tokelau ringworm and it is noteworthy that the concentric rings were reproduced in the experimental animals guinea-pigs and monkeys.

Epidermophytosis.—An article by KESTVEN* emanates from Australia and it is natural that the local name of surfer's foot should be used. The author agrees that the name is not good but over half the patients investigated in Sydney were not surf bathers. The disease was found to be present in 38 per cent of people examined but we are not given exact numbers. Sixteen different fungi were isolated and grown, all the organisms being described very fully.

* CATANEI (A.) Etude des teignes du cuir chevelu dans les colonies françaises. *Arch Inst Pasteur d'Algérie* 1939 Mar Vol 17 No 1 pp 47-54. With 4 figs. on 1 plate. [11 refs.]

* MAPLESTONE (P. A.) & DRY (N. C.) A Microsporum New to India.—*Indian Med Gaz.* 1939 Mar Vol. 74 No. 3 pp 148-151. With 7 colour figs. on 1 plate & 3 text figs.

* CATANEI (A.) & GRENIERBOLEY (J.) Etude de teignes de la peau observées au Tonkin.—*Arch Inst Pasteur d'Algérie* 1939 June Vol. 17 No. 2 pp 282-285. With 3 figs. on 1 plate.

* KESTVEN (H. Leighton) The Mycotic Flora of Surfers Foot in Sydney. *Med J Aust.* 1939 Mar 19, 1939 Apr 2, 1939 Apr 9, 1939 Apr 16, 1939 Apr 23, 1939 Apr 30, 1939 May 7, 1939 May 14, 1939 May 21, 1939 May 28, 1939 June 4, 1939 June 11, 1939 June 18, 1939 June 25, 1939 July 2, 1939 July 9, 1939 July 16, 1939 July 23, 1939 July 30, 1939 Aug 6, 1939 Aug 13, 1939 Aug 20, 1939 Aug 27, 1939 Sept 3, 1939 Sept 10, 1939 Sept 17, 1939 Sept 24, 1939 Oct 1, 1939 Oct 8, 1939 Oct 15, 1939 Oct 22, 1939 Oct 29, 1939 Nov 5, 1939 Nov 12, 1939 Nov 19, 1939 Nov 26, 1939 Dec 3, 1939 Dec 10, 1939 Dec 17, 1939 Dec 24, 1939 Dec 31, 1939

The methods of detection of fungi in scales and cultural details, are discussed. The author's own descriptions are based on specimens grown at 35°C. on Sabouraud's glucose agar. Nomenclature receives deserved criticism and reference is made to Dodge's Medical Mycology. The following list is incomplete but indicates the types found and investigated: *E. asperum* McCarthy, *E. pedis* Ota, *E. album* n. sp., *E. flavum* n. sp., *E. cerebriforme* Dodge, *E. macrosporicum* n. sp., *E. interdigitale* Priestley, *E. planum* n. sp., *Ectotrichophyton mendographites* Robin, *Microsporum canis* and various *Monilia*. He also makes the interesting suggestion that the disease might be spread by infected leather. ZUNDEL¹⁰ has made thorough studies of 250 patients seen in Berlin. Very full details are given concerning 133 cultures including the methods of control difficulties encountered, etc. *E. inguinale* was found on 15 occasions, *E. interdigitale* Kaufmann-Wolf 68 times, the remainder comprising specimens of *E. rubrum*, *E. plurizoniforme*, *E. lanosum* and *T. pedis* β Ota.

Fungi and Treatment.—Thirteen years work is reviewed by Mc and KROTCHER¹¹ who have published the results of their observations on ringworm in Peking. Altogether there were 6 013 clinically suspicious cases, but of these only 2,531 gave positive results on microscopy. The majority of these patients (2,501) were of Chinese stock. Scalp favus was seen on 82 occasions occurring mostly under the age of 15 years but also seen as late as 30 years of age. All were in members of the poorer classes and cultures always revealed the presence of *A. schoenleini*. There were 1 104 examples of tinea tonsurans, boys outnumbering girls by 25 to 1, the greatest disproportion found in this series of cases although males greatly outnumber females in all the categories. In all only six cases of kerion were seen and the organisms found were *T. violaceum*, *T. endo-ectothrix*, *M. ferrugineum* and *T. glabrum* in that order of frequency. But the most remarkable fact about this group is that 11.8 per cent. of the patients were over the age of sixteen. In Britain of course the disease is practically unknown after that age. No note is made concerning the sexual development of these individuals. Tinea circinata was seen 760 times, *E. rubrum* proving to be the most common fungus. Among 526 cases of epidermophytosis of the extremities and 49 patients with nail infection, the same organism was usually responsible.

Investigations have been carried out by MAPLESTONE and DEX¹² into the therapeutic value of dyes in various fungal infections. Reference is made to Acton's gentian violet treatment of the purulent folliculitis caused by *T. violaceum* whilst the many dyes that have been used for pyogenic infections also receive notice. The authors have treated many types of fungal disease by their method and claim good results. They have gradually evolved the following formula: 1 per cent. brilliant green, 1 per cent. gentian violet, 10 per cent. alcohol, water to make up to 100 per cent. This lotion is dabbed on freely twice a day after opening pustules and vesicles. Success has

¹⁰ ZUNDEL (M.). Die ektoparasitischen Epidermophytonpilze.—Arch. f. Dermat. u. Syph. 1939 May '77 Vol. 179 No. 1 pp. 1-57 With 43 figs. [2 pages of refs.]

¹¹ Mc (J. W.) & KROTCHER (T. J.). Statistical and Mycological Studies of Dermatomycoses observed in Peking.—Ch. Ann. Med. J., 1939 Mar Vol. 35 No. 3 pp. 201-219 [12 refs.]

¹² MAPLESTONE (P. A.) & DEX (N. C.). The Use of Dyes in Various Fungal Infections.—Indian Med. Gaz. 1939 July Vol. 74 No. 7 pp. 391-394. With 2 figs. 30 refs.]

been attained in the purulent folliculitis epidermophytosis of the hands and feet the intertrigo and mango toe forms of *A. keratolytica* infection and in the interdigital and paronychia forms of moniliasis

Pseudomycosis—GOHAR¹² has been struck by the incongruous association against precedent of certain species of fungi and lesions as well as their absence where they are confidently expected. A series of 100 sputa was investigated 71 of them being obtained from cases which were clinically pulmonary tuberculosis the remainder representing pneumonias abscesses, bronchitis and effusion. Some 17 different organisms were isolated *Aspergillus fumigatus* *A. niger* and *Sporospora albicans* being the most common. Even these however showed no consistency in incidence or type. Among 5 cases of tinea cruris one of them actually grew *Endodermophyton concentricum* although no signs remotely resembling tokelau ringworm were seen. From one case of chromoblastomycosis was grown *Phialophora verrucosa* but from a second was merely grown the saprophyte *Pullularia pullulans*. *Fusarium solani* was isolated from a gluteal blastomycosis (Ibrahim's disease). In conclusion the author feels that inconsistencies are so marked and Koch's postulates are so rarely fulfilled that a strong case can be made for pseudomycosis.

Pruritus ani—Certain indefinite eruptions in the neighbourhood of the anus are often mistakenly termed pruritus ani. CASTELLANI¹¹ points out that many of these cases are really local fungus infections and that their association with epidermophytosis of the feet is common. There may be indefinite reddish patches sheets of dermatitis which may be smooth and pink rough and reddened dry or moist. Later thickening and lichenification ensue but atrophic and depigmentary changes are rare. Trichophyton like fungi are nearly always present when such appearances are due to such infection and not to other causes. Of these *E. floccosum* Hartz and *T. rubrum* Castellani are the most common. Very rarely monilial organisms seem to be responsible. *M. pinovi* and various examples of the *Cryptococcus* and *Torulopsis* types have been found. Treatment is dealt with very fully but the three following ointments receive strongest praise: (1) precipitated sulphur 3-6 per cent salicylic acid 3-6 per cent in vaseline (2) Deek's ointment Salicylic acid 4 per cent bismuth subnitrate 10 per cent mag salicyl 4 per cent ol. eucalypt 4 per cent petrolatum 39 per cent and wool fat 39 per cent (3) phenol 1 per cent salicylic acid 3-6 per cent benzoic acid 3-6 per cent in vaseline.

Unusual pigmentations—This subject is discussed by MANSON-BAHR and RANSFORD¹³. Carotinaemia has been seen in Kenya Nigeria and India and five cases in resident Europeans are described. All the patients had persistently low blood-pressures but the source of

¹² GOHAR (N.) Mycosis v Pseudomycosis a Record of Some Fungi isolated in Egypt.—*Jl Trop Med & Hyg* 1939 Aug 1 Vol 42, No 15 pp 229-234 [42 refs.] With 1 chart.

¹¹ CASTELLANI (Aldo) Mycotic Pruritus Ani a Short General Account.—*Jl Trop Med. & Hyg* 1938 Dec. 1 Vol 41 No 23 pp 377-380 With 2 figs.

¹³ MANSON-BAHR (Philip) & RANSFORD (O. N.) Some Pigmentations of the Skin occurring in Patients from the Tropics. Carotinaemia, Haemochromatosis and Alkaptonuria.—*Trans Roy Soc Trop Med & Hyg* 1938, Nov 26 Vol. 32, No. 3 pp 395-404 With 1 plate [2 refs.]

the pigment seemed to be in the food, although it could not be detected with certainty. Two cases of haemochromatosis are mentioned. These were seen in Egypt and Kenya and naturally caused some confusion because of the hepatomegaly. In East Africa one example of alkaptonuria was detected and this inherent disease probably predisposed the patient to the many tropical infections from which he suffered, malaria, amoebic dysentery etc. It is laid down that patients with either of these two latter maladies (haemochromatosis and alkaptonuria) are unsuitable for life in the tropics.

Loewenthal's publications—This author¹⁶ has presented a long series of articles over three years which between them cover the whole range of dermatology as seen in negroes. It is certainly unfortunate that they have not been published in book form for they have appeared at varying intervals in the *Journal of Tropical Medicine and Hygiene*. It is even more unfortunate that the various subjects have been so cut that the second part of some sections appears weeks after the first. A very simple example will suffice. On page 99 of volume 42 there are brief notes concerning guinea-worm infection two months later on page 159 there are pictures of guinea-worm infection whilst the only letterpress concerned with the subject consists of the bibliography. These are very definite drawbacks but they may well not be the fault of the author. Nevertheless he has done great service in drawing attention to the differences both apparent and real, which occur when diseases attack a black skin.

No exact definition of a negro is possible nor is it attempted. The term really includes all peoples with deeply pigmented skin, kinky hair and some skeletal peculiarities. In dealing with the anatomy of the skin¹⁷ the following points are stressed. There is some relative thickening of the horny layer whilst the corium has a richer blood supply and the vessels lie nearer to the surface than in white skins. Most noticeable however are the large numbers of sweat and sebaceous glands. Indeed the apocrine glands are three times more numerous than they are in the white skin. The sebaceous glands are often independent of follicles, even attaining a very large size when connected merely with lanugo hairs. Actually lanugo hair is sparse and the coarse hairs of the body, scalp and beard show a "fuzzy" appearance consequent on elliptical cross-section and the fact that the follicles are themselves curved with the concavity directed towards the surface. Pigmentation in the nails is diffuse and increases years often result in its appearance in longitudinal strips. Certain physiological functions receive special notice¹⁸ and among these the question of heat regulation is perhaps of greatest importance for black surfaces absorb heat more readily than do others. Yet the negro stands tropical heat better than does the European. The relative abundance of subcutaneous fat, the superficial position of the vessels and the numbers of sweat glands suffice to explain the adaptation. The pigment protects against the effects of excess of actinic

¹⁶ LOEWENTHAL (LEONARD J. A.). *Diseases of the Skin in Negroes*—[*J. Trop. Med. & Hyg.* 1936 Vol. 39 pp. 209-212 250-251 286-284 276-279 295-297 1937 Vol. 40 pp. 4-8 206-208 277-281 324-327 1938 Vol. 41 pp. 21-29 41-43 88-91 187-189. 1939 Vol. 42 pp. 20-23 36-33 63-60 99-104 189-191 With 58 figs. (Numerous refs.)

¹⁷ See LOEWENTHAL, 1936. pp. 209-212.

¹⁸ See LOEWENTHAL, 1936. pp. 250-251.

rare and additional fluorescence is given by increased sebum. The problem of actual colour and tinting¹⁹ shows considerable degrees of variation. It may be said that the darkest tribes are those who have lived on poor soil for generations whilst groups that have led forest lives tend to have lighter skins. The blood mixtures of immigrant tribes modify all these considerations whilst in mulattoes the colour varies in a way by no means proportional to the blood mixture but rather as though the higher grades of pigmentation are incompletely dominant over the lower. The difference in depth of colour in different parts of the body is well recognized but this inherited factor follows two general rules: the trunk is dark dorsally and light ventrally; the extensor surfaces of the limbs are dark and the flexor aspects are light. It is obvious that the degree of laxity of the skin is of importance e.g. bending the knee lightens the colour by reducing the amount of pigment per square inch as the skin is stretched. Normally, paler areas are the palms, soles, back of the heels, clavicular region, the sternal area, the midline of the back, the supraorbital ridge, upper eyelids, malar prominences, tip of nose and chin in front of and behind the ears and lastly creases. Increased colour is seen in the nipples, the genitalia, back of neck, lower part of belly, lower eyelid, upper lip and the centre of the cheeks. The pigment concerned is of course melanin²⁰ and it is surprising that the total amount thereof is yet less than one gram. The mode of its formation, chemistry and distribution are fully discussed. Its presence in mucous membranes is interesting: thus 89 per cent show patches in the centre of the gum surface, 40 per cent show pigment in the cheeks, 33 per cent on the hard palate, 33 per cent on the tongue, 30 per cent on the lips and 26 per cent on the soft palate. Many children have a distinct rufous tinge in their hair which may not be lost until puberty, although it never persists after that age.

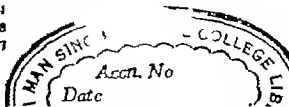
Certain dermatoses are particularly common among negroes.²¹ A fibroplastic diathesis is seen in the case with which keloids are formed, the hypertrophic scarring, formed round chronic ulcers and in the perineum in uncomplicated gonorrhoea. Lichenoid lesions occur because the lichenoid papule is a common reaction to many different stimuli, a change which often renders exact diagnosis almost impossible. As a consequence few cases of prolonged irritation escape lichenification. Dermatitis papulosa nigra is naevoid and has never been reported in an individual of non negro descent. On the other hand certain dermatoses are definitely more rare. Resistance to external irritants is increased, trauma from light is unusual and a natural resistance to certain diseases is believed to exist. Thus psoriasis, rosacea, eczema and seborrhoeic dermatitis are uncommon whilst alopecia senilis and prickly heat are definitely rare. It is obvious that these people are less subject to cancer consequent on light and other external factors but statements that melanoma and other forms of internal carcinoma are less common are much open to doubt. The author believes that individuals react to itching as diversely as do whites. The detection of the simpler lesions may be fraught with difficulties.²² A macule is easily overlooked but pure

¹⁹ See LOEWENTHAL, ¹⁴ 1936 pp 260-264

²⁰ See LOEWENTHAL, ¹⁴ 1936 pp 278-278

²¹ See LOEWENTHAL, ¹⁴ 1936 pp 286-287

²² See LOEWENTHAL, ¹⁴ 1937 pp 4-8.



erythema can be seen to darken the affected area whilst local epithelial oedema lightens it. Often purpura cannot be diagnosed unless the mucous membranes or other organs are affected. Papules tend to be paler than the surrounding skin and post-inflammatory changes may include depigmentation most marked in the achromia seen after yaws. A greyish appearance is given when the superficial layers are disturbed by scratching. Other colour changes may be due to fungi e.g. the darkening seen in the presence of *T. nigrum*.

Congenital anomalies of pigmentation³³ include albinism in which consanguinity and heredity play big parts. The incomplete form or freckled albinism is more common than is the complete variety. Partial albinism or piebalds are seen and the local change often consists of but a single tuft of white hair. In xanthism, which is fairly common the hair is a golden or reddish brown. It is really a condition of diminished pigmentation which leaves the skin a warm brown colour. Increased deposition of melanin is seen in moles and naevoid patches or stripes. Mongolian spots sometimes persist throughout life. The acquired anomalies of pigmentation may be classified as idiopathic (or vitiligo) and as following some local or general disturbance³⁴ so far as diminution is concerned. In their differentiation the absence of any history of antecedent dermatosis is important but it is often possible to be certain without that as the advancing edges of the white patches are always regular and convex. Increased deposition of melanin may also occur after many skin diseases, particularly pellagra, syphilis, lichen planus, dermatitis exfoliativa, psoriasis, sarcoids, etc.

The opening paragraphs³⁵ of the sections devoted to fungous diseases are concerned with the many drawbacks from which medical mycology suffers. Organisms are found to have two or more names at different, or even at the same stages of their life-cycle. New species and varieties are reported almost daily without due regard to established works of reference and fungi are repeatedly incriminated as pathogenic agents with little if any justification. Many of us echo these remarks with tired sighs. In the discussion of this huge subject the author has therefore adapted Vuillemin's classification to his own needs. This has been well done but the scattering of the articles through so many widely separated numbers of the journal makes it extremely difficult for the average reader. Diseases are thus dealt with in the order demanded by the mycological classification, a fact which leads to some surprising juxtapositions from the point of view of the clinician.

Blastomycosis is described as "any disease due to fungi which appear in the lesions as roundish or oval cells, at times budding, with complete absence of mycelium. The general clinical features are divided into primary and secondary characters. The former are again subdivided into papulo-ulcerative, verrucous and gummatous types. The latter are produced by abscesses and gummata in or under the skin which rupture to produce sinuses or deep ulcers. The usual pictures and treatments are described but reference is also made to California disease and its differences from the better known types of blastomycosis. The changes caused by yeasts and yeast-like fungi³⁶ are

³³ See LOWENTHAL, 1937 pp. 285-286

³⁴ See LOWENTHAL, 1937 pp. 277-281

³⁵ See LOWENTHAL, 1937 pp. 224-227

³⁶ See LOWENTHAL, 1938 pp. 21-26.

divided into four choical forms. The blastomycotic with its subcutaneous abscesses and sinus formation the intertriginous continuous waterbath and dysidrosiform affections of the nails and lastly miscellaneous pictures such as those presented by cutaneous thrush perlèche prickly heat and some eczematoid eruptions. The trichomycoses are dealt with in the same article. These comprise piedra trichonocardiasis (trichomycosis flava etc.) trichomycosis nodosa of Behrend (leptothrix) and tinea nodosa or piedra nostras. In all these the fungal hyphae are woven together into a compact mass cemented together by a viscous substance. In considering dermatitis verrucosa²⁷ it is pointed out that there is considerable confusion in the descriptions of the fungi but it seems probable that only two species are really responsible *Phialophora verrucosa* Medlar and *Trichosporum pedrosoi* vel *Hormodendron pedrosoi*. Similar organisms can apparently cause achromia parasitaria and other lesions closely resembling psoriasis and lichen planus. The descriptions of pityriasis versicolor and tinea flava are here broken but are continued in the next number²⁸. Not only do these show as lighter patches but there is actual depigmentation with refractoriness to the regeneration of melanin on irradiation. Next we come to the actinomycoses and maduromycoses all producing mycetomas. Their species are given in full detail but the main clinical description concerns itself with the ordinary actinomycosis due to *A. bovis* and which differs in no way from the disease as seen in whites. This section is succeeded by Tokelau ringworm caused by *Endodermophyton Castellani* 1909. The description of this malady is broken abruptly and is not resumed until some seventeen weeks later²⁹ when sporotrichosis and rhinocladiosis are discussed in the same article.

In the first of three sections devoted to ringworm³⁰ favus erythrasma microsporion infections *T. endothrix* and *T. ectothrix* are all dealt with. Special attention is paid to three particular varieties of trichophytosis (1) the copper-coloured form of carate caused by *T. megnini* (2) the whitish patches on the head and neck caused by *T. boninum* (3) calor de figo described by von BASSEWITZ in 1920 which shows plantar hyperkeratosis fissuring and deep pigmentation. It is stressed³¹ that trichophytide eruptions usually follow the deeper types of infection but that they may follow the more superficial infection especially in negroes. These lide rashes are often papular and with a particular tendency to hit the hair follicles of the neck and upper trunk in the coloured races. They may also be vesicular pustular or lichenoid. Those types which have been said to resemble erythema scarlatiniforme erythema nodosum or pityriasis rosea have not been detected in negroes. In discussing epidermophytosis the terms Dhobi's itch and Hong Kong foot are used and we do not once come across the modern title of athlete's foot for this old established Empire disease. The next section³² opens with general considerations anent the diagnosis and treatment of ringworm and then proceeds to the first group of maladies caused by animal parasites. These comprise those resulting from helminth infection schisto-

²⁷ See LOEWENTHAL, ¹⁴ 1938 pp. 41-45.

²⁸ See LOEWENTHAL, ¹⁴ 1938 pp. 53-64.

²⁹ See LOEWENTHAL, ¹⁴ 1938 pp. 187-189.

³⁰ See LOEWENTHAL, ¹⁴ 1939 pp. 20-25.

³¹ See LOEWENTHAL, ¹⁴ 1939 pp. 36-38.

³² See LOEWENTHAL, ¹⁴ 1939 pp. 53-60.



Pinta in a woman of 85 seen at St. Croix Hospital for Leprosy, St. Croix, Virgin Islands

[Reproduced from the *Archives of Dermatology & Syphilology*]

and extremities and extensive areas of partial or complete depigmentation. The appearances were typical of pinta and the positive Wassermann reaction is in favour of that disease. C II

BRICEÑO-IRAGORRY (L.) Sobre cromoblastomycosis. [Chromoblastomycosis.]—*Rev. Clínica Louis Razetti*. Caracas, 1939 Vol. I No 2 pp 106-128 With 13 figs. [10 refs.]

A brief introduction giving the history of this condition first described a quarter of a century ago is followed by an account of a case in a negro 48 years of age, showing verrucose and ulcerating lesions of the legs (see illustration). On Sabouraud's medium there developed slowly a mould which exhibited Carrón's three types of



Verrucous and ulcerating lesions of leg in case of chromoblastomycosis in a negro in Venezuela.

[Reproduced from the *Revista de la Clinica "Luis Razetti"*]

fructification 1 *Hormodendron* the conidiophores forming by differentiation of the mycelium 2 *Pseudo-Acrotheca* the conidiophores developing not at the end but below and around the terminal joint 3 *Phialophora* type, as in *pedrosi* in which the terminal joint ends in a sort of calyx in the bottom of which the conidia develop

On macroscopical and microscopical findings and the results of animal inoculation the condition was ascribed to *Hormodendron pedrosi* but seeing that all three types of fructification were observed the author wishes to create a new genus for those exhibiting all three at the same time and names it *Carrionia*, in the present case *Carrionia pedrosi*

H H S

BERTONI (Armando) Le attuali conoscenze sui dermomiceti dell'Africa Italiana. [Dermomycetes at present known to occur in Italian East Africa.]—*Riv di Biol Colon* Rome, 1938 Aug Vol. 1 No 4 pp 269-280 [17 refs.] English summary (2 lines)

The author gives brief notes on sixteen species of fungi observed in cutaneous affections in East Africa and the characters of the lesions

with which they have been found associated. The paper is purely clinical and in no way critical, nor is any experimental work recorded in connexion with any of the forms referred to H H S

BORUS (Michael) *Dermatitis Venenata* due to Ginkgo Berries.—*Arch Dermat & Syph* 1939 Mar Vol 39 No 3 p. 530

The ginkgo tree a native of eastern China also known as maidenhair tree and silver apricot is commonly cultivated for its ornamental foliage. The seeds have a soft pulp coating with a pungent odour and before the seeds are planted this is usually removed. If the removal is carelessly done or if the operator is susceptible dermatitis may be set up. In the case reported a man of 29 years picked some of the berries and washed the pulp off with plain water (no soap) and a cloth. Two days later he felt a burning sensation in hands and eyelids followed by oedema erythema and vesicles on the face. The vesicles spread to other parts of the body. Under treatment with soothing lotions and compresses the vesicles disappeared in a week leaving a dry scaling erythema. A patch test with the berries was carried out ten days later with a marked allergic response. H H S

NIÑO (Flavio L.) *Contribucion al estudio de las tricopatias pedricas de Venezuela* (Piedra in Venezuela).—*Urotopathologia*, The Hague 1939 Vol. 2 No 1 pp 7-11 With 5 plates. English summary (6 lines)

In Venezuela, as in Colombia, Brazil and Argentine two trichopathies of the piedra type were found, namely one with black knots, caused by *Piedraia Hortii* and another with light coloured knots, the so-called Colombian piedra. The last named trichopathy is caused by *Trichosporium gieselerium* Hedrend, 1890 not causing hair lesions, and by *T. brassicaeformis* Marx et Niño 1932, causing hair lesions but it is possible that both species are referable to the same taxonomic entity

AMOEBIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

KAGY (p 110) draws attention to the urgency of the problem of amoebiasis in the United States between 5 and 10 per cent. of the population are probably infected. He discusses modes of infection. CONNELL and FRENCH (p 111) support the belief that no part of the United States is free from amoebiasis. Many infected students in a group examined were not ill enough to report for treatment and for this reason diagnosis is frequently missed. Carbarsone and emetine treatment was very successful. In the United States Navy SAPIRO and JOHNSON (p 111) show that recruits from the Southern States are more frequently infected than others, but there was no excessive infection in men stationed at Panama or in the personnel of submarines. Men from China and the Philippines showed high rates, up to 28.1 per cent. There are only 4-6 cases of actual dysentery for every 1 000 carriers during the course of a year in the Navy.

MILLER (p 113) gives figures of infection in Saskatchewan. VEGHNE RODRIGUEZ (p 113) reports that the disease is widespread in Chile. In Hungary BOBROGI and MAKARA (p. 114) found more infection in villages than in towns, and especially in school-children.

TAYLOR (p 114) discusses carriers in China and advocates regular supervision of servants and the strict prohibition of human excreta as fertilizer for vegetable gardens as well as the avoidance of vegetables from unknown sources.

SOHIFR and JAILMES (p 114) use Mallory's phosphotungstic haematoxylin for staining amoebae in fixed wet films.

CRUG (p 115) enriches culture media with Difco tryptone and Difco yeast extract. FRYE and MELENEY (p 115) use a solution of liver extract in normal saline to cover the egg or serum slopes for cultivation of *E. histolytica*. This is successful and has the advantage that it can be repeatedly sterilized without injury. MELENEY *et al* (p 115) show that prolonged cultivation does not generally alter the pathogenicity of *E. histolytica*. BONIN and AREAS (p 115) produced emetine resistant cultures which retained some part of their acquired resistance even when grown for several passages in emetine free media.

SWARTZWELDER (p 116) describes the process of excystation in experimental work in dogs.

KO DO (p 116) as a result of experiments concludes that vegetative *E. histolytica* cannot cause liver abscess in dogs or kittens either after injection into the blood stream or directly into the liver.

TSUCHIYA (p 117) infected rats with cysts from human carriers but the animals showed no symptoms and no lesions were found in the intestinal mucosa. Spontaneous recovery was usual and the rat therefore is not probably a natural host. BOE (p 117) finds that infection of rats is possible provided they have been previously fed on a diet rich in carbohydrates and cod liver oil. No symptoms or intestinal lesions are found the infection being confined to the lumen of the intestine.

SOLARINO (p 117) from careful blood examination in amoebic dysentery finds the only change to be a mild anaemia of the chlorotic type.

BANERJEE (p 118) draws attention to the fact that less than half of those infected show dysenteric symptoms. He describes the other symptoms experienced by his patients and states that these were cured by emetine. In the tropics any complaint referable to the alimentary tract should be an indication for examination of the stools for *E. histolytica*.

MACDONALD (p 118) describes a patient with liver abscess who gave no history of dysentery and had no amoebae in the stools. SCAFFIDI (p 118) describes a case of liver abscess.

CHUNG *et al* (p 119) by injecting lipiodol into amoebic liver abscess cavities and by periodical X ray examination have shown that healing may take weeks or months. It should not therefore be considered that a short course of emetine which may clear up the symptoms is all that is necessary. Cavities may actually increase in size under emetine treatment owing to liquefaction of the necrotic wall. HUARD (p 119) describes multiple liver abscesses in a patient in Indo-China which were associated with *Bact. coli* septicæmia. No *E. histolytica* were found in the pus but no search was apparently made for them in the stools. Ova of *Ascaris* were present in the pus and SCOTT in comment suggests that the abscess may have been due to a wandering *Ascaris* subsequently disintegrated.

CELIS and MEDINA (p 120) discuss four cases of amoebic lung abscess and consider that the lungs became involved by extension from the liver. GIRGIS (p 120) describes two cases of multiple amoebic

abscesses in the lungs. Both patients had dysentery and liver abscesses and the pulmonary infection was probably the result of spread by the blood stream. MORRA (p 121) in describing the two cases diagnosed as pulmonary amoebiasis, ascribes one to a blood infection the other to an air borne infection.

A patient reported by GABRIEL (p 121) showed extensive and deep ulceration of long standing arising from an anal abscess. He had been in tropical countries but denied previous dysentery and no protozoa were found in stools or discharge from the ulcer. Amoebiasis was suspected and emetine produced remarkable amelioration. Cysts were later found in the stools. SMITH *et al* (p 122) report amoebic ulceration of the penis in a Chinese farmer who had no other amoebic infection. Emetine rapidly cured the condition. From experiments in animals JORANSON and SIMONS (p 122) suggest that *E. histolytica* may be a cause of human peptic ulcers.

ZANCA (p 123) gives results of the Triboulet test in amoebiasis. AOKI (p 123) has obtained an extract from *Entamoeba* cultures which gives positive skin tests in amoebiasis.

On account of the similarity between the symptoms of emetine poisoning and beriberi ALAIX and RAGIOT (p 123) give vitamin B₁ when there are symptoms of emetine intolerance with success. CASTEX and DI CIO (p 123) report on the value of Hoechst 5547 a preparation of bismuth and arsenic in amoebiasis. It is more useful in chronic than in acute conditions.

GROSS (p 124) realizing that acid stools favour the growth of *E. histolytica* maintains an alkaline reaction after apparent cure in the hope of avoiding relapses.

C II

VON KROGH (Mentz) Chronische Amöbiase. [Chronic Amoebiasis].—*Arch f Schiff- u Trop Hyg* 1939 July Vol 43 No 7 pp 257-268.

This is a general account such as is to be found in all reputable text books dealing with the intestinal disturbances occurring in chronic infections by *E. histolytica* their symptoms treatment and prognosis. It is of the nature of a medical lecture and as such reviews the subject adequately but presents no new information nor any illustrative cases.

H H S

KAGY (Edwin S) The Amoebiasis Problem.—*Milit Surgeon* 1938 Aug Vol 83 No. 2 pp 158-167 [Summary taken from *Public Health Engineering Abstr* Washington 1939 Apr 29 Vol 19 Signed Richard D HOAX] [Summary appears also in *Bulletin of Hygiene*].

Studies by the U.S. Medical Corps indicate the gravity and urgency of a very real public health problem in amoebiasis. Nature and scope of problem delineated.

Amoebiasis, of which amoebic dysentery is only a part of the clinical picture probably exists throughout the world wherever sought by competent workers it has been found. As a result of studies covering every section of the United States it has been estimated that between 5 per cent and 10 per cent of the population of this country probably harbours *Entamoeba histolytica*. Although more prevalent in tropical regions it has been found wherever sought in the temperate zone. Clinically persons infected may be divided into four classes in

which symptoms vary from none appreciable (the so-called healthy carriers) to those accompanying acute or chronic amoebic dysentery.

Pollution of food or drink with feces containing cysts of *Endamoeba histolytica* allows transmission of amoebiasis. Such contamination may occur through an infected water supply through the use of night soil in fertilizing garden truck through handling food and drink by infected persons through fly droppings and in other ways. Although food handling is held to be the most important means of transmission in communities with a satisfactory water supply contamination of water supplies is thought to operate just as frequently and to result in an even greater number of infections where the water supply is obtained from dubious sources.

CONNELL (Frank H.) & FRENCH (Harry T.) The Incidence and Results of Treatment of Subclinical Amoebiasis—*Jl Amer Med Assoc* 1939 Aug 19 Vol 113 No 4 pp 649-652. [12 refs]

It has been estimated by CRAIG that between 5 and 10 per cent of the population of the United States harbour *E. histolytica*. The authors examined 1,351 males in 1934 and 1936 finding an incidence of about 1.8 per cent after two examinations for each person by smear with Heidenhain's iron haematoxylin. A later investigation of 670 men showed 5 to be positive after a single smear examination. From these findings it appears that no part of the country is free from amoebiasis. Only 8 of 37 infected students were ill enough to seek medical advice and in no case had the diagnosis been made when they had done so. Treatment given to these infected persons consisted of carbarsone with emetine and after the third day of treatment it was impossible to find amoebae in the stools. There were no toxic symptoms or relapses. These good results may perhaps be attributed to lack of opportunity for reinfection.

In the discussion on this paper BORLAND stated that 58 per cent of infections may be missed if only one stool is examined. LAKE made a plea for the use of the therapeutic test if other examinations are negative and there is reason for suspicion. PALMER questioned the pathogenicity of the small cyst forms but Connell in reply considered that the size of the cysts was not a safe criterion in this respect.

C II

SAPERO (J. J.) & JOHNSON (C. M.) *Endamoeba histolytica* and Other Intestinal Parasites: Incidence in Various Exposed Groups of the Navy—*U.S. Nat. Med. Bull.* 1939 Apr Vol 37 No 2 pp 279-287. [17 refs]

The paper gives an account of the examination mostly at Panama of groups of men in the U.S. navy for intestinal protozoal and helminthic infections. At the outset it is pointed out that some 10,000 men are stationed in parts of the world where amoebic dysentery is highly endemic so that the chances of acquiring infections would appear to be considerable. The technique of all groups was similar three specimens from each man being examined after the administration of a single dose of 2 drachms of fluid extract of cascara sagrada before the first specimen was collected. Both fresh saline and stained films were made from each case. Owing to the thinness of the films undoubtedly many helminthic infections were missed. As a control

naval recruits were examined at the naval training station in Norfolk, Va. It was found that recruits from the Southern States gave a higher infection rate than those from other States—thus, the incidence of *E. histolytica* was 14.7 per cent. in the former and 7.8 per cent. in the latter. It is thus clear that many of the infections found in men who had served for some time in the navy must have been acquired before the commencement of naval service.

TABLE I.
Intestinal Parasites in Naval Recruits—Control Group

	Southern States	Other States
Total number of men examined	129	77
Percentage of protozoal infections	Per cent 63.6	Per cent. 48.1
Percentage of helminth infections	17.1	—
<i>E. histolytica</i>	14.7	7.8
<i>E. coli</i>	30.5	29.6
<i>E. magna</i>	29.5	23.4
<i>I. battecheri</i>	9.3	—
<i>D. fragilis</i>	17.1	10.4
<i>G. lamblia</i>	7.8	5.2
<i>C. parvum</i>	2.3	2.6
<i>T. brucei</i>	2.3	2.6
<i>N. americanus</i>	14.0	—
<i>T. trichiura</i>	3.0	—
Naval Service—Average per man (weeks)	3.9	28.0

An examination of men who had been stationed at Panama and who had been repeatedly exposed to infections on shore during Central American cruises showed that no new infections had occurred, the *E. histolytica* incidence being 9.5 per cent. which is slightly lower than the 11 per cent. found amongst the recruits. An examination of a submarine group also showed that there had been no spread of infection during the close contact of infected and uninfected individuals which is inevitable in this kind of vessel. A different result was obtained with men returning from duty in Peiping, Shanghai and the Philippine Islands. Here an *E. histolytica* rate of 28.1 was obtained an indication that fresh infections had been acquired in Asia. Similar higher rates were obtained for other parasites. Taking all groups together it was found that one-half of the men harboured one or more intestinal protozoa, while the helminthic rate (chiefly *Necator americanus*) was 5.6 per cent. The *E. histolytica* rate of 11.6 per cent. is about the same as that of the general population of the U.S.A. according to a number of surveys which have been carried out by different observers. With this high rate of infection amongst the general public there can be little danger of returning naval men influencing the incidence amongst the civil population in any appreciable manner. As regards the incidence of actual amoebic dysentery in the navy with its 15,000

carriers of *E. histolytica* there are only 4-6 cases for every 1 000 carriers during the course of a year. It is pointed out that though some observers believe that at least 65 per cent of all carriers show definite symptoms of infection it has yet to be shown what are the determining factors necessary for the development of actual amoebic dysentery in apparently healthy carriers. C M Wenyon

MILLER (Max J.) The Intestinal Protozoa of Man in Midwestern Canada.—*Jl Parasitology* 1939 Aug Vol 25 No 4 pp 355-357

The paper gives the results of the examination of 254 persons for intestinal protozoa in Saskatoon Saskatchewan in the summer of 1938. There were three groups—hospital patients students and nurses orphan asylum children. Of the total 38.2 per cent were positive for parasites. The institution group was most highly infected. Thus for *Entamoeba histolytica* the first and second groups combined 207 persons in all gave a percentage infection rate of not more than 1 per cent. while for the orphans 47 children the rate was 23 per cent. Double infections were found in only 3.3 per cent of the combined group and in 32.6 per cent of the institutional group. C M W

NEGHME RODRIGUEZ (Amador) La amebiasis en Chile [Amoebiasis in Chile]—48 pp. With 8 figs. on 4 plates 1 graph 1 chart & 3 maps. [59 refs.] 1938 Santiago Facultad de Biología y Ciencias Médicas Instituto de Biología.

In this article the author gives an account of certain observations he has made on amoebiasis in Chile. The disease is widespread throughout the whole country and from the results of the examination of different groups its incidence corresponds with that which has been proved to occur in other similar localities. As regards the causative organism cultural and other work has been carried out and thus without adding to our knowledge of *E. histolytica* indicates that the Chilean strains do not differ from those of other parts of the world. The main interest of the paper which is largely a review of present knowledge, is that it calls attention to the high incidence of amoebic infections in this part of South America. C M W

NEGHME RODRIGUEZ (Amador) Encuesta sobre amebiasis y otras enteroparasitosis en los conscriptos de la III Guarnición Militar (Concepción) Segunda comunicación [Amoebiasis and other Endoparasitic Infections in Chilean Recruits.]—*Rev Chilena de Hig y Med Preventiva* 1938 July-Sept. Vol. 1 No 7-9 pp 367-369

— La amebiasis y otras enteroparasitos en los reclutas del ejército Chileno Tercera comunicación.—*Ibid* pp 370-371

— La amebiasis y otras enteroparasitosis en los conscriptos del ejército Chileno IV comunicación Guarnición Militar de Arica.—*Ibid* pp 372-374

— La amebiasis y otras enteroparasitosis en los conscriptos del ejército de Chile. V comunicación Guarnición Militar de Valparaíso.—*Ibid* p 406

These papers record the results of the examination of four groups of recruits in different districts of Chile for evidence of intestinal helminthic and protozoal infections. All the usual intestinal protozoa

were found, as also the common helminths. The number of cases examined and the percentage infected are set out in a series of tables

C M W

BODROGI (G) & MAKARA (G) Beitrag zu Entamoeba histolytica Infektionen in Ungarn. [Amoebiasis in Hungary]—*Med Klin* 1939 July 7 Vol 35 No 27 (1902) pp 917-919

In the Government Hygienic Institute during the six months September 1937-February 1938 among 2,526 examinations for protozoal infections 288 were found to have *E. histolytica* in vegetative or cyst form. Most of the infections were among school-children and the authors concluded that the infection rates were higher in the villages than in the towns. In one village "22 per cent of the children examined were found infected [but this figure conveys little as the number examined is not stated]. Brief notes are given of five cases in adults, with general remarks on the incubation period, symptoms, diagnosis and treatment.

H H S

TAYLOR (H W Y) The Problem of the Amoebic Carrier—*Jl Trop Med & Hyg* 1939 Feb 15 Vol 42 No. 4 pp 49-51

In Mukden, Manchuria, six students at the Medical College in the autumn of 1937 were attacked with acute amoebic dysentery. A new cook was found to be passing *E. histolytica* cysts in quantity and a table-boy was also a cyst passer. The infection was thought to come from one or other of these. In Mukden however in spite of improved sanitation and a piped water supply replacing wells, the incidence of amoebic dysentery and colitis remains unchanged. In fact the disease is now endemic. The number of cases increases in September-November and it is noteworthy that melons grown in fields fertilized with human excreta are eaten by all.

The author uses the above facts to stress that regular supervision of servants is a necessity and periodical examination of all cooks and those handling food and finally the avoidance of vegetables from unknown sources or—a counsel of perfection not likely to be adopted in China at present—strict prohibition of human excreta for vegetable gardens.

H H S

SOHIER (R) & JAULMES (Ch.) Etude d'un procédé simple de coloration des amibes par l'hématoryline phosphotungstique. [Simple Method of staining Amoebae with Phosphotungstic Haematoxylin.]—*Bull Soc Path Exot* 1939 Jan 11 Vol 32 No 1 pp 25-27 With 4 figs on 1 plate

The authors point out that for staining dysentery amoebae in wet fixed films use may be made of Mallory's phosphotungstic haematoxylin in place of the more usual iron haematoxylin. It is noted that in the preparation of the stain the quantity of phosphotungstic acid to be added to the solution of haematoxylin varies with the brand of haematoxylin employed. The stain is prepared according to the formula of MALLORY

C M W

CRAIG (Gladys M.) Enrichment of Culture Media for *Entamoeba histolytica*—*Amer J Trop Med* 1939 Sept Vol 19 No 5 pp 483-489

Working with cultures of *Entamoeba histolytica* in Cleveland's medium and Tanabe-Cluba medium and making allowances for the concentration of amoebae in the inoculum used to commence cultures, it was found that the addition to the media of Difco tryptone and Difco yeast extract accelerated the growth of the amoebae. It is thought that such growth-stimulating substances give indications of methods of improving culture media for amoebae. C M II

FRYE (William W.) & MELENEY (Henry E.) Liver Extract as a Substitute for Serum in the Culture Medium for *Entamoeba histolytica*—*Science* 1939 June 16 N S Vol 89 No 2320 pp 564-565

The authors have found that for the cultivation of *Entamoeba histolytica* the serum-containing liquids which cover the egg slant of Loeffler's blood serum can be satisfactorily replaced by 0.5 per cent solution of liver extract (Lilly No 343) in 0.85 per cent sodium chloride solution. The medium is just as good for the maintenance of old strains as for the starting of new ones from amoebae or cysts. A number of other brands of liver extract have been found to be equally serviceable. On this medium *E. coli* and *Endolimax nana* as well as *Blastocystis* have failed to grow whereas *Trichomonas hominis* and *Chilomastix mesnili* have been maintained till discarded. One advantage of the liver extract solution is that it can be sterilized repeatedly without injury. C M II

MELENEY (Henry E.) FRYE (William W.) & LEATHERS (W S.) The Effect of Prolonged Cultivation on the Pathogenicity of Various Strains of *Entamoeba histolytica* for Kittens.—*Amer J Hyg* 1939 Mar Vol 29 No 2 Sect C pp 61-71 With 1 fig [17 refs.]

In previous work the authors have studied the pathogenic activity of various culture strains of *Entamoeba histolytica* employing routine methods of culture and a routine method of inoculation of the material to be tested directly into the intestine just above the ileo-caecal valve [see this *Bulletin* 1938 Vol 35 p 585 1939 Vol 36 p 293]. In this paper further experiments along these lines have been carried out and it has been found that all of the strains previously tested with the exception of one have retained the same pathogenic index as they had previously. The index of the one strain which varied has been for two years about 70 per cent of its former index. The result shows that the pathogenic index of any strain generally remains unaltered for long periods of culture. C M IV

BOUENIN (H.) & ARETAS (R.) Résistance acquise des amibes (*Entamoeba dysenteriae*) à l'émétine *in vitro* [Acquired Resistance of *E. histolytica* to Emetine *in vitro*].—*C R Soc Biol* 1939 Vol 130 No 5 pp 495-496

By exposing *Entamoeba histolytica* in cultures to increasing concentrations of emetine it was possible to obtain cultures resistant (377)

to concentrations which were rapidly fatal at the start of the experiments. These exposed amoebae were small and formed minute pseudopodia and revealed other morphological changes. When grown for several passages in emetine-free media the amoebae returned to normal again but still retained some at least of the acquired resistance to emetine

C M W

SWARTZWELDER (John Clyde) Experimental Studies on *Endamoeba histolytica* in the Dog.—*Amer J Hyg* 1939 Mar Vol. 29 No 2 Sect C pp 89-100 [23 refs]

The author has tested the possibility of cysts excysting in the large intestine of dogs. Inoculation of cysts *per anum* up to the caecum and retardation of evacuation by various means failed to bring about excystation. In one instance in which cysts were inoculated at laparotomy above a ligature round the colon excystation occurred, but this was under such unnatural conditions that it is concluded that auto-infection from cysts of *E. histolytica* does not occur. Following oral administration of cysts excystation occurred in the small intestine in 1.5 to 4.5 hours. The process of excystation is described as a revolving movement of the quadrinucleate amoeba in the cyst, the production of a tear in the cyst wall and the escape of the amoebae. At no stage were amoebae with more than four nuclei found. The quadrinucleate amoebae were succeeded by uninucleate forms. Tissue invasion occurred within 24 hours. Cysts which had been refrigerated for 43 days at about 5°C. excysted when fed to a dog. Unripe cysts which were allowed almost no incubation period outside the body produced infection, while five of thirteen dogs became infected following ingestion of trophozoites, which were shown to pass through the stomach in a viable condition. Trophozoites were shown to withstand fairly high concentrations of hydrochloric acid *in vitro*. C M W

KONDO (Hiroshi) Investigations of Amoebic Dysentery. XXI. Experimental Studies of Amoebic Liver Abscesses in Dogs. XXII. Experimental Studies of Amoebic Liver Abscesses in Kittens.—*Jl Oriental Med* 1939 July Vol. 31 No 1 [In Japanese pp 13-22 With 1 plate English summary p 2 In Japanese pp 23-27 With 1 plate English summary p 3.]

The author concludes that *E. histolytica* in the vegetative form is unable to cause liver abscess in dogs, young or old, on the following grounds. Using cultures of the amoebae and injecting them into the heart blood direct he could not produce abscesses in either lungs or liver when mingled with blood—arterial, venous, or portal—in *vitro* the amoebae degenerated. even within 5 minutes of injection into the mesenteric veins no amoebae could be seen in the hepatic vein blood. direct injection into the parenchyma of the liver did not produce abscess unless bacteria were present. injection of amoebae and bacteria into the mesenteric veins gave rise to numerous microscopical abscesses, though no amoebae could be found in the abscesses or elsewhere in the liver. In kittens similar results were obtained.

H H S

TSUCHIYA (H) Experimental Amebiasis In Rats with Cysts of Human Carriers with Especial Reference to a Probable Mechanism Involved.—*Amer J Trop Med* 1939 Mar Vol 19 No 2 pp 151-162. [20 refs]

Experiments were carried out with a view to testing the possibility of infecting rats with cysts of *E. histolytica* from human carrier cases. Cysts after washing were introduced into the lower part of the oesophagus of rats by means of a rubber catheter attached to a syringe, each rat receiving under ether anaesthesia about 500 000 cysts in 2 cc. of fluid. Of 78 rats used 13 became infected the highest infection rate being amongst those in which the stomach was empty at the time of injection. Infected rats passed cysts in their faeces and these administered to other rats produced infections more readily. At the fifth passage the amoebae had adapted themselves to rats to the extent that the rate of infection was doubled. The infected rats revealed no symptoms of their infection while the examination of the intestine post mortem did not disclose any lesions of the mucosa. Spontaneous recovery was the rule and it was concluded that in nature the rat is an incidental rather than a natural host of the dysentery amoeba. C M H

BOE (Johs) Experimentelle *Entamoeba histolytica* Infektionen bei Ratten [Experimental *E. histolytica* Infection In Rats]—*Zent f Bakt I Abt Orig* 1939 May 12 Vol 143 No 78 pp 393-398 [17 refs]

It is shown that rats can be readily infected with *Entamoeba histolytica* by administration of cysts by the mouth provided that the animals have been fed for the previous four days on a diet rich in carbohydrates and on cod liver oil. In a series of 20 animals thus treated all became infected while 12 of them passed cysts. The infection was limited to the intestinal lumen there being no symptoms during life and no sign of lesions at autopsy. The animals were killed after 7 to 30 days and in all *minuta* forms of the amoeba were found while cysts were detected in a number. C M H

SOLARINO (Giuseppe) Sul reperto ematologico nell'amebiasi. [Haematological Findings in (Intestinal) Amoebiasis]—*Haematologica* Pavia. 1939 Vol 20 No 7 pp 617-644 With 2 charts [53 refs] French summary

This study must have entailed a considerable amount of work of a somewhat irksome nature. The author has made a very full examination of the blood of nine patients with amoebic dysentery: enumeration of red and of white cells, measurements of the former differential count of the latter and haemoglobin estimation by the Hellige Sahli method. It is satisfactory to know that the changes noted showed but little departure—in some cases none—from the normal. Erythrocytes ranged between 4,500 000 and 5 700 000 per cmm, haemoglobin 80 to 105 and most between 91 and 100 per cent, colour index 0.8 to 1.03, most between 0.8 and 0.9, diameter of red cells between 6.5 and 7.3 μ , average 7.09. Leucocytes ranged between 5 600 and 15,800, 8 were below 8 000 and 11 above this and as a rule not much above the average of all works out at 9,337. The higher leucocyte counts were usually in the earlier acute stages. In short the only change was a mild anaemia of the chlorotic type. H H S

BAUERJEE (Probodh K.) Intestinal Amebiasis its Clinical Manifestations.—*Calcutta Med J.* 1939 May Vol. 35 No 5 pp 353-357

The idea that intestinal amebiasis is nearly always, if not invariably associated with dysenteric symptoms is a common mistake, and one to which practitioners newly arrived in the tropics are prone hence the value of this article analysing 139 patients of whom less than half presented dysenteric symptoms. In another 59 the chief complaint was of dyspepsia—loss of appetite indigestion discomfort in the abdomen and troublesome flatulence, in many with constipation and heart-burn five had pain and tenderness in the appendicular region [it is possible that the entamoebae were located there] four had purely gastric symptoms—acidity pyrosis, gastric discomfort with constipation others who gave no history of previous dysentery or diarrhoea, complained of heaviness and discomfort in the right hypochondrium, a little enlargement of liver and loss of appetite In all these cases the usual line of treatment had been tried in vain until examination of the stools showed the presence of *E. histolytica* and appropriate treatment resulted speedily in cure The moral, of course, is that in any case in the tropics of complaint referable to the alimentary tract faecal examination should be made and special search for *E. histolytica*.
H H S

CASTEX (Mariano R.) La clínica de la amebiasis. [The Clinical Aspects of Amebiasis].—*Revista Med Argentina*. 1939 July 12 Vol. 28 No 28. pp 1347-1350 [81 refs]

MACDONALD (Ian) An Insidious Amoebic Liver Abscess.—*Jl Roy Soc Med Sero* 1939 Jan. Vol. 25 No. 1 pp 73-74

That amoebic abscess of the liver may have an insidious onset is a fact well known to all tropical practitioners, but that there should have been no indications of any preceding dysentery or of intestinal disturbance is sufficiently rare to warrant this case being recorded. The patient was a well built man of 37 years who when reporting sick, stated that he had had vague dyspeptic symptoms for 48 hours, pain below the ribs on the right side for 36 hours, increasing in intensity but no looseness of bowels he had had no dysentery in the past, nor any pain before this attack. Faecal examination revealed no amoebae nor cysts of them He was sent to hospital at Shanghai with a diagnosis of acute cholecystitis. Repeated examinations were still negative as regards amoebae Operation was undertaken and a liver abscess found pointing just below the right costal margin. This was drained and emetine was given. Amoebae have not been found subsequently [The report does not state whether discharge from the walls of the abscess was examined for them]
H H S

SCAFFIDI (Vittorio) Jr Ascesso epatico amebico primitivo a sintomatologia generale [Primary Hepatic Abscess with Systemic Symptoms].—Reprinted from *Clin Med Italiana*. 1938. Vol. 60 No 5-6 13 pp With 3 figs [20 refs]

The patient a man of 42 years, suffered with ill-defined symptoms, chills and fever for six months, and during the sixth had enlargement

of liver with pain some degree of jaundice and diarrhoea. *E. histolytica* was then found in the stools. Two exploratory punctures were made into the liver at the site of the greatest pain but without finding pus. The blood showed red cells 2,710 000 haemoglobin 41 per cent leucocytes 18,200 per cmm with 83 per cent. polymorphonuclears. The condition cleared on exhibition of emetine but reappeared a month later and again after a further interval of two months each time a course of emetine was given. Seen six months afterwards the patient was keeping well. [The account would lose none of its interest if redundant matter were omitted. The facts that the patient's mother had 18 children at term and 3 miscarriages that he himself was the happy result of an easy delivery and that he was suckled by his mother can have little bearing on his acquiring an amoebic hepatitis at the age of forty two.] H H S

CHUNG (Huei Lan) KUO (T Y) CHANG (Stephen K. P.) & MA (W S.)
The Visualization of Amoebic Liver Abscess.—*Chinese Med J*
1939 Apr Vol 55 No 4 pp 357-370 With 12 figs.

A physician should not be satisfied with merely the clearing up of symptoms when he treats a patient with amoebic abscess of the liver. It is important for him to know to what extent the liver tissue has been destroyed and how long it takes for complete healing and not to regard the patient as no longer under his care when a ten-days course of emetine has abolished the symptoms and rendered the stools free of amoebae.

By the authors' mode of procedure—aspiration of the pus injection of air and 10-20 cc. lipiodol—lipiodol sinks to the bottom of the cavity and the air floats above it and a fluoroscopy (or an X ray photograph) will reveal the actual size of the cavity. To facilitate this pictures may be taken in different positions. By taking them at intervals the reduction in size can be followed up. Details are given with photographs of five cases in which this procedure has been carried out and the authors conclude that though a 7-10 days course of 0.06 gm emetine daily may relieve the symptoms render the stools and abscess fluid free from amoebae and restore the leucocyte count to normal in a few days more actual healing of the liver injury may take weeks or even months. Further for a short period after emetine treatment the cavity may actually become larger owing to liquefaction of the necrotic wall. Two small abscesses with a communicating sinus may thus join up to form a single large cavity. In some cases a long time is needed before the lipiodol is completely absorbed 12 months or more and it is suggested that 20 cc. are more than is necessary one-half or even one-quarter of that amount would probably suffice.

H H S

HUARD (P.) Abscès du foie et septicémie à colibacilles. [Hepatic Abscess and *Bacterium coli* Septicaemia.]—*Bull Soc Path Exot.*
1939 July 12 Vol. 32. No 7 pp 708-711

The patient an adult whose age is not stated, was admitted to hospital for haematemesis and the same evening twice passed blood in the stools (melaena) the cause being given as gastro-duodenal ulcer. Haemoculture yielded a growth of *Bact coli*. Five days after entering hospital, there was dullness over the base of the right lung and enlargement of the liver. A sudden onset of pain in the epigastric

region and collapse led to exploratory laparotomy. The stomach and duodenum appeared to be normal but the under surface of the liver presented an inflammatory swelling which on being handled, burst and voided black, gaseous malodorous pus. It contained streptococci and *Bact. coli* and some ova of *Ascaris*, but no amoebae were seen. Death took place six days later there having in the meantime been further melaena and expulsion of ascariides. At autopsy the liver was found to contain several abscesses and signs of infarcts.

In the discussion which followed the recording of this case Dr. Pons pointedly remarked on the tendency of the author in recent years to stress the bacterial source of liver abscess in Indo-China as against the amoebic. In the present case nothing is said of any search in the stools for vegetative or cystic forms of *E. histolytica* or of faecal examination at all. The abscess might be due to *E. histolytica* with secondary portal pyaemia. [No suggestion is made that the whole condition might be due to young migrating *Ascaris* setting up hepatitis and abscess. The worms were present in the bowel and ova were seen in the discharge from the abscess. It is quite possible that the worm itself may have become disintegrated in the pus.] H H S

WILMOTH (Clifford Lee). Liver Abscess: its Diagnosis and Treatment.—*Jl Trop Med & Hyg* 1939 Oct 16 Vol. 42 No 20 pp. 313-316 [13 refs.]

CELIS (Alejandro) & MEDINA (Miguel). Abscesos pulmonares amebianos aparentemente primitivos [Amoebic Abscesses (Apparently Primary) of the Lung].—*Medicina*, Mexico 1939 July 10 Vol. 19 No 343 pp. 234-246 With 11 figs.

It is not quite clear what the authors imply by the term 'apparently primary'. Four cases are described in which the physical signs and X-ray findings indicate right basal pulmonary lesions which cleared up on administration of emetine. Three of the patients gave a history of previous dysentery and in all four cases cysts of *E. histolytica* were seen on faecal examination. The fourth had suffered for five months with fever, pain in the right side of the chest, troublesome cough with sputum containing pus and blood, diminished respiratory movement, dull note to percussion and so forth. The question is discussed whether the lung became involved by extension from the liver, the signs or the lesion in the latter having disappeared or been overlooked, or whether the lung was invaded by the blood or lymphatic route without involving the liver. The authors decide in favour of the former because all showed adhesions between the liver and the diaphragm. [In view of the history of preceding dysentery, the presence of cysts of *E. histolytica* in the stools, and the final decision as to the mode of invasion of the lung, the use of the word 'primary' is hardly justified.] H H S

GIRGIS (Sami). Pulmonary Amoebiasis.—*Jl Egyptian Med Assoc* 1939 July Vol. 22 No 7 pp. 402-418 With 11 figs. [11 refs.]

Two cases are described with commendable detail, giving the clinical history, the physical examination and post mortem findings, macroscopical and microscopical, in the lungs. From the conditions found the author believes that infection was carried from the liver to the lungs by the blood vascular route through the right side of the heart to the pulmonary circulation for entamoebae were found in the

pulmonary arterioles. In the first patient a man of 38 years the amoebae were found within and without the vessels and living free in the pulmonary abscess cavity. Both this man and the second aged 60 years suffered from dysentery and from amoebic abscess of the liver. As would be expected if the infection was carried to the lungs by the blood stream the abscesses were multiple and not individually large. The amoebae were not seen actually within the bronchioles but from breaking down of lung tissue they might be seen on examination of the sputum. H H S

MORRA (Orlando Cabral) Amoebiasis pulmonar (Pulmonary Amoebiasis).—*Brasil Medico* 1938 Aug 20 Vol 52 No 34 pp 751-758 With 7 figs English summary

Two cases are described which were diagnosed as pulmonary amoebiasis owing to the discovery of what were taken to be *Entamoeba histolytica* in material coughed from the lung. In both cases *E. histolytica* was present in the sputum. In one case there was suppuration with abscess cavity formation at the base of the right lung in the other case the condition was one of bronchitis. In the first case the abscess cavity was drained while emetin and arsenicals were administered. Though a temporary improvement occurred death took place some months later. The second patient made a good recovery under the medical treatment. The paper recounts in detail the various examinations of the lungs and bronchi which were carried out and a series of X ray photographs illustrate the findings. It is said that in the suppurative case the spread of infection to the lung was probably by way of the blood vessels while the features of the bronchitic case if indeed it was actually one of bronchial amoebiasis suggested infection of the lungs by way of the air. C M Henyon

GABRIEL (W B) A Case of Amoebic Ulceration of the Rectum and Anus.—*Proc Roy Soc Med* 1939 June Vol 32 No 8 pp 902-904 (Sect Surg pp 54-56) With 5 figs

This is a remarkable case of success of emetine treatment. The patient a man of 35 years who had served in the Army in India



Condition on admission to hospital in April 1938.



Ulceration completely healed November 1938

Amoebic Ulceration of Rectum and Anus

[Reproduced from the *Proceedings of the Royal Society of Medicine*]

Mesopotamia, Malta and China, but had not been ill in any of these places and denied having suffered from dysentery. In 1935 he developed an anal abscess which ruptured and continued to discharge for two and a half years. In April 1938 he was very ill, emaciated and anaemic, with a temperature 101 F and pulse 120 per minute. He showed an enormous ulcer with necrosis of muscles and gangrene of skin and subcutaneous tissue. Kahn and Wassermann reactions were negative. No protozoa were seen in faeces or in scrapings from the lesions, but on the suggested possibility of its amoebic origin emetine hydrochloride gr $\frac{1}{2}$ b d was given and even in four days the improvement, both local and general, was marked. Nine days after beginning the treatment cysts of *E. histolytica* were seen in the faeces, and by the next day the ulceration had cleaned, sloughs separated, leaving a smooth granulating surface. After 4 days interval he was given a ten-days' course of E.B. I (gr $\frac{1}{2}$ at night) and an injection of 2 oz. of 2.5 per cent. yatro into a distal colotomy wound. His condition in April and in November 1938 is shown in the accompanying illustrations. H H S

SHIH (H. E.) WU (A. K.) & LIU (A. T.) Amoebiasis of the Penis.—*Chinese Med J* 1939 Feb Vol. 55 No. 2, pp. 139-145. With 5 figs.

Cutaneous amoebiasis has been recorded [see this *Bulletin* 1925 Vol. 22, p. 368] but not as a primary condition. LEE in 1932 reported invasion of a carcinoma of the cervix by *E. histolytica* and in 1933 NGAI and FRANKER reviewed and discussed 27 cases reported in the preceding 42 years [see this *Bulletin* 1934 Vol. 31 p. 651]. Cases usually arise either from an abscess (of the liver for example) discharging on the abdominal wall, or from extension from the bowel. In the present instance the origin was not discovered. A Chinese farmer 54 years of age had an ulceration of the penis, of 5 months duration. It was considered to be either malignant or pyogenic. Examination of the exudate and superficial layers revealed amoebae, with all the characters of *E. histolytica*. There was no history of dysentery; faeces were examined repeatedly for *Entamoeba* with negative results, and he denied extraneous intercourse. Treatment with emetine brought about a speedy cure. Unfortunately his home was too far off for his wife to come for examination—consequently a likely source—dysentery in his wife—could not be ruled out. H H S

JORANSON (Ingve) & SIMON (Joseph) *Entamoeba histolytica*. Experimental Infection of the Stomachs of Dogs and Cats.—*Arch Pathology* 1939 Feb Vol. 27 No. 2, pp. 218-233. With 7 figs. [26 refs.]

In a series of 51 dogs and 8 cats cultures of *Entamoeba histolytica* were inoculated into the sub-mucosa of the pyloric region of the stomach by passing the syringe needle through the peritoneal surface at laparotomy. In 15 dogs and 2 cats death followed the resulting gastric lesions which varied in character from nodules to open ulcers. In only two of such lesions were amoebae actually seen in serial sections. It is evident that *E. histolytica* is able to withstand the action of gastric juice. It is thought that the resemblance of the experimental lesions to the human peptic ulcers suggests that *E. histolytica* may be a cause of these. C M W

ZANGAN (Bernardo) La reazione di Triboulet nelle enterocolopatie parassitarie [Triboulet Test in Parasitic Intestinal Infections. — *Arch. Ital. Sci. Med. Colon e Parassit.* 1939 July Vol. 20 No 7 pp 390-407]

The paper gives the result of the application of the Triboulet test which is merely a modification of the Schmidt test for the presence of bilirubin to the faeces of a number of cases of intestinal protozoal and helminthic infections. Only in cases of *Entamoeba histolytica* was the percentage of positive results appreciably higher than those obtained from normal individuals. Testing for blood at the same time it was found that this was present in 32.1 per cent. of the patients giving a negative Triboulet reaction and in 38 per cent. of those in whom it was positive. C M H

AOKI (Hisashi) Investigations on Amebic Dysentery XX. A New Simple Method for the Diagnosis of Amebiasis.—*Jl. Oriental Med.* 1939 May Vol. 30 No 5 In Japanese pp 939-943 English summary p 264]

The author states that he has obtained from *Entamoeba* cultures an extract which in patients with amoebic dysentery always gives a positive cutaneous reaction usually but not invariably positive in cyst passers negative in bacillary dysentery typhoid and other intestinal disease. [The method of extraction is not given in the English summary.] H H S

ALAIN (M.) & RAGIOT (Ch.) De la diminution des effets toxiques de l'émétine par l'emploi de la vitamine B₁ (Essais effectués au cours du traitement de l'amibiase.) [Vitamin B₁ in Emetine Intoxication.]—*Bull. Soc. Path. Exot.* 1939 Mar 8. Vol. 32 No 3 pp 300-303

The authors note the varying dosage of emetine deemed necessary to eradicate amoebiasis and that before the end aimed at is achieved toxic effects may show themselves—digestive circulatory and nervous. The last may partake of the nature of a polyneuritis resembling that of beriberi. On this account the authors employed vitamin B₁ for treatment of these cases with good results and a short step from this was to use the vitamin with the emetine when there were indications of intolerance. They found it very successful in such cases and quote brief notes of six such—the dose of vitamin was 1 cgm. daily for adults. H H S

CASTEX (Mariano R.) & DI CIO (Alfredo V.) El preparado 5547 en el tratamiento de la amibiase intestinal. [The Treatment of Intestinal Amoebiasis by Hoechst 5547]—*Revista Méd. Argentina* 1939 May 31 Vol. 28 No 22 pp 1041-1043

Hoechst 5547 is a preparation designed to aid the absorption of arsenic by combining it with bismuth—it contains 16.6 per cent. arsenic with 33.3 per cent. bismuth. It is a dark brownish powder insoluble in water put up in small tablets (grageas) coated and containing 0.25 gm. each.

The authors have tested it on 50 patients passing *Entamoeba histolytica* or its cysts or both. They gave it at first in doses of 0.5 gm.

ce daily but this was followed by tachycardia, palpitation, weakness, insomnia. They then reduced the dose to half giving it for 6 days. The result was disappearance of the amoebae with improvement in symptoms and the general state of the patients. It proved best in cases of chronic intestinal amoebiasis. In those with hepatic mischief should be given very cautiously, if at all, and it is not suitable for children. Tenosmus and spasm do not disappear so rapidly as the other symptoms. This is ascribed to the large amount of bismuth present. In such cases the Hoechst 5547 may be combined with an antispasmodic. rivanol is suggested. H H S

OSB (H) A Probable Cause of the Difficulty of treating Chronic Amoebic Infection in this Country—*Indian Med Gaz.* 1939 Jan Vol 74 No 1 pp 27-29

The author stresses the well-known fact that patients after apparent cure of amoebiasis relapse again at intervals when treatment is stopped. He noted that in such cases the reaction of the stool was often in fact acid, which favours growth of *E. histolytica*. He therefore decided to regulate the diet to maintain an alkaline reaction of the stool and found that so long as this occurred there was no relapse. The number of cases (three) is too few for valid deduction but it is a point worth following up. H H S

MALARIA

PRELIMS OF ABSTRACTS IN THIS SECTION

OGEL and RIOT (p 125) discuss malaria in the French colonies. AMOTE (p 126) notes that *P. falciparum* is the only parasite found in young children in a part of the Belgian Congo. PARISTY (p 126) reports that in Italian East Africa *P. vivax* is more commonly found than *P. falciparum*. ALVES (p 127) reports two cases of acute infection in S. Rhodesia.

JANKOVICH (p 127) records studies, which cannot be further abstracted, in the biology of *A. maculipennis*. FRIEDL and SOMOR (p 127) report on the habits and relative prevalence of three subspecies of *A. maculipennis* near Odessa.

The explanation of the occurrence of malaria on the Witwatersrand where *A. gambiae* and *A. funestus* do not normally occur appears to be that infected *A. gambiae* have been introduced in motor cars from other malarious areas. It is not probable that they will survive the winter (DR MILLON and CEAR, p 129).

The vectors in the island of Poulo-Condore off Cochin-China are *Anopheles* and *A. sinuipennis* both salt water breeders. FARDIAUD (p 128) shows that there is frequent importation of fresh strains of malaria and that this with the state of undernourishment and confined living space has great importance in maintaining high prevalence. VAX DEY BURGHE and HOVAIS (p 129) show that *P. falciparum* tends to attack mature red cells rather than reticulocytes, though the latter may be affected.

MURRAY and AL (p 129) record an instance of long latent period *P. vivax* infection. The attack was thought to be precipitated by

vaccination against yellow fever STRICKLAND and BAIRD (p 129) report malaria in six infants less than 8 days old CINGOLI and FLORENCO (p 130) discuss appendicitis with coincident malaria or simulated by malaria Indications for differential diagnosis are given CHATTEJEE (p 130) reports three cases of malaria in which urticaria was a constant accompaniment

CHILD and PANFEROVA (p 130) show that Henri's reaction does not become positive until the onset of clinical symptom however long the incubation period SCOTTI (p 131) obtained positive agglutination reaction with *Br. melitensis* in sera of patients with malaria

NIVEN (p 131) shows that on an estate in an infested area atebirin 0.3 gm. once weekly was effective in suppressing clinical malaria and produced marked reduction in gametocyte carriers especially in benign tertian cases From experiments in Sardinia CASINI (p 132) concludes that by atebirin or quinine prophylaxis it is possible to reduce malaria symptoms spleen and parasite rates and improve the general health but not to eradicate malaria Atebrin is more effective than quinine in preventing subtertian malaria RASHINA and KHOVANSKAYA (p 133) have obtained good result in a district in Russia where malaria is seasonal by treatment with acraquine and plasmoquine and the administration of plasmoquine during the transmitting season to all persons who had previously had malaria The anophelines breed in irrigation canals and anti mosquito measures are necessary for proper control BARZA (p 133) reports general improvement in health and considerable reduction in spleen and parasite rates after the administration of plasmoquine 0.02 gm (adult dose) twice weekly in Persia Further work on the prophylaxis of malaria by the administration of premaline twice each month to about 27 000 people in an intensely malarious district in Turus is reported by DELOUX *et al* (p 134) No anti mosquito measures are taken but the results achieved in the reduction of the parasite and spleen rates are remarkable and patients treated with premaline and then given the prophylactic course (which lasts from June to November) have not relapsed

NIVEN (p 134) has studied the action of prontosil in malaria it is less effective than quinine and is not an efficient gametocide He (p 135) reports unfavourably on paludex in treatment DELOUX *et al* (p 135) report unfavourably on the gametocidal action of cihonal in *P. falciparum* infection and prefer rhodopraequine

FARINAUD (p 136) details the measures which have been successful in reducing the incidence of malaria in an estate in the far east

SATTA (p 136) reports unfavourably on hexachlorothane as a larvicide

HOLMES (p 136) describes the value of mosquito traps in any control scheme in Kuala Lumpur

C II

VOGEL (E.) & RIOU (M) Les maladies épidémiques endémiques et sociales dans les colonies françaises pendant l'année 1937 Paludisme [Malaria in French Colonies during 1937]—*Ann de Méd et de Pharm Colon* 1939 Apr Vol 37 Supplément pp 324-353

This report gives information about the prevalence of malaria during 1937 in all the French colonial possessions and in the mandated

GINCOLD (N) & FLORESCO (P) Sur quelques éléments de diagnostic dans les syndromes abdominaux aigus dus au paludisme [Points of Diagnostic Significance in Acute Abdominal Symptoms caused by Malaria].—*Bull Acad Méd Roumanie* 1939 4th Year Vol. 7 No 2 pp. 68-76. [13 refs.]

The authors describe two cases of acute malaria in which the symptoms simulated those of acute appendicitis. Reference is made to many similar cases reported in the literature during recent years [see also this *Bulletin* 1938 Vol. 35 p. 812]. Occasionally diagnostic difficulties are considerable. In cases in which the symptoms are due to malaria there are often sudden variations in the patient's general condition and in subjective and objective symptoms, from hour to hour such as are never observed in the acute abdominal affections which are simulated. Observations of temperature and pulse should be made four or five times a day. In acute abdominal conditions demanding surgical intervention constipation is the rule. In malarial cases the stools are often normal or there may be diarrhoea. In malarial cases pain occasioned by superficial palpation is very acute, sometimes more acute than that caused by deep palpation. The disappearance of symptoms after the administration of quinine or plasmoquine is of course of diagnostic significance. If the patient's condition justifies the postponement of surgical intervention this method of arriving at a diagnosis should be attempted. The mere existence of symptoms of malarial infection does not preclude the possibility of the coexistence of an acute surgical abdomen.

The authors agree that there is no specific lesion responsible for these symptoms, which are caused by the obstruction of capillaries by the detritus of parasites and pigment, giving rise to congestion. N IV

CHATTERJEE (S. C.) Urticaria in Malarial Infection.—*Calcutta Med J* 1939 Apr Vol. 35 No. 4 pp. 291-293

Three cases of malaria are described: one subtertian and two benign tertian, in which urticaria was a constant accompaniment of the fever subsiding when the temperature fell. Fever and urticaria alike responded to quinine therapy. The author considers it probable that the urticaria is the allergic response to the protein of broken down red cells in persons sensitized by previous infections. A IV

CHUB (G. M.) & PANFEROVA (E. A.) Réaction de mélanofoculation Henri en présence du paludisme expérimental [Henry's Reaction in Experimental Malaria].—*Med. Parasi. & Parasitic Dis* Moscow 1938 Vol. 7 No. 6 [In Russian pp. 783-799 With 3 charts [35 refs.] French summary p. 800]

In 41 cases of *P. vivax* malaria, infected experimentally by mosquitoes, with incubation periods ranging from 264 to 381 days, it was found that Henry's reaction remained persistently negative throughout these very prolonged incubation periods. Positive reactions were only obtained after the onset of clinical symptoms, fever and the appearance of parasites in the peripheral blood.

A IV

Scorri (Giuseppe) Sierodiagnosis di Wright e malaria. [Agglutination Reaction and Malaria.]—*Arch Ital Sci Med Colon e Parassit* 1939 Mar Vol 20 No 3 pp 133-144 '11 refs' [Summary appears also in *Bulletin of Hygiene*]

The observation that the serum of a patient with malaria gave a positive agglutination reaction with *Brucella melitensis* prompted the author to examine a hundred cases of malaria from this point of view. Positive reactions were obtained in a large number of cases and with different strains of *Brucella*. The results are summarized in table II of his paper —

Percentage of positive agglutinations obtained with different strains of Brucella with varying dilutions of serum of malaria patients

Strain of Brucella	Dilution of Serum			
	1 100	1 200	1 400	1 800
	Percent.	Percent.	Percent.	Percent.
<i>Br. melitensis</i> Arkwright	25	11	6	6
Caprino	4	2	1	1
H 26	0	0	0	0
Zammit	12	21	8	16
<i>parameleitensis</i> Bassett Smith	17	24	9	15
<i>abortus</i> Bang	0	0	0	0

N II

SÃO PAULO (Fernando) Tratamento do paludismo [Treatment of Malaria.]—*Hospital* Rio de Janeiro 1939 Apr Vol 15 No 4 pp 667-688.

This is a lecture on the treatment of malaria from the clinical point of view. Most if not all of the specific and paraspecific remedies that have been used in the treatment of this disease are dealt with and the symptomatic treatment of the complications and sequelae of malaria receive attention.

A II

FEDERATED MALAY STATES. ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1937 [KINGSBURY (A. Neave) Director] [Malaria. pp 96-106 & 147-148. NIVEN (J. E.) Acting Malaria Research Officer]

The results of experiments on estates to determine the relative value of atabrin and quinine in clinical prophylaxis in accordance with a programme drawn up by the Malaria Commission of the League of Nations have been published [see this *Bulletin* 1938 Vol 35 p 96]. On one of these estates surrounded by swampy jungle where there is uncontrolled anopheline breeding the suspension of drug administration for eight weeks was responsible for a sharp rise in the number of malaria attacks. Drugs were readministered, the former atabrin group receiving quinine and the former quinine group atabrin. The adult doses were atabrin 0.3 gm. once a week, quinine bishydrochloride 1 gm. once a week. Atabrin in this dose was effective in suppressing

clinical malaria the dose of quinine was too small. In the atebain group there was a marked reduction in the number of gametocyte carriers, particularly among benign tertian cases. Suspension of drug prophylaxis, after 13 months administration, was once more followed by a markedly increased incidence of clinical malaria.

In another estate atebain 0.3 gm. was given fortnightly and then at ten-day intervals. This dose is not completely effective. The conclusion is reached that 0.3 gm. weekly is the minimum effective prophylactic dose of atebain for adults.

In the General Hospital, Kuala Lumpur 134 subtertian and 70 benign tertian cases were treated with totaquina the quinine treated controls numbering 129 and 73 respectively. All these test cases had not less than 1000 asexual parasites per cubic millimetre of peripheral blood. There is no significant difference between the two drugs in rapidity of action in destroying parasites or in reducing fever. Neither is an efficient subtertian gametocide. Two grammes a day was considered to be the optimum dose of totaquina, for adults.

Five cases of benign tertian malaria were treated with a proprietary remedy homaline I three of them required quinine treatment before the end of a week.

Paludex was found to be inefficient as a remedy for acute infections with the Malayan strains of *P. falciparum*.

Prontosil, 0.9 gm. a day was given to a few cases, without success.

N. W.

CASATI (G.) Tre anni di profilassi e terapia della malaria a Posada (Sardegna) [Three Years of Malaria Prophylaxis and Therapy in Posada (Sardinia)]—*Riv. di Malariologia* Sez. I. 1939 Vol. 18. No. 1 pp. 1-16. English summary

In 1935 an experiment was carried out in Posada, Sardinia, a small town of 780 inhabitants, intensely malarious to determine the value of atebain as a prophylactic. This was a contribution to the inquiry which the Malaria Commission of the League of Nations was undertaking and the results were duly reported [see this *Bulletin* 1938 Vol. 35 pp. 28-29]. The experiment was continued during the two following years with certain modifications. In 1936-37 277 individuals received atebain twice a week, same doses as before, and 312 received quinine, adult dose 0.60 gm. twice a week, and the administration was continued throughout the year and not confined to the epidemic period as in the first year. About 200 persons refused treatment. In the epidemic period of 1937 May to October quinine was given three times a week, atebain twice a week as before. Cases of malaria were treated with the drug used as a prophylactic, atebain 7 days treatment, quinine 15 days treatment. Blood examinations of all persons were made once a month.

No toxic symptoms were experienced. Bi-weekly administration of atebain is effective. The number of fever cases in the atebain groups was 40 among 244 in the first year, 16 among 277 in the second year and 4 among 175 in the third year (May to October only). Febrile cases in the quinine groups numbered 47 out of 312 in 1936-37 and 78 out of 391 in the epidemic season of 1937.

Benign tertian cases were very rare in both groups. atebain was much more effective than quinine in preventing malignant tertian

fever. The spleen and parasite indices in March 1935 were 78.7 and 21.6 per cent. In March 1937 they were 37.4 and 7.6 per cent. The general conclusion is reached that by atabrin or quinine prophylaxis especially if this be continued through the inter-epidemic period accompanied by prompt treatment of all febrile attacks it is possible to reduce malaria symptoms, spleen rates and parasite rates and to effect a marked improvement in the health of a population but it is not possible by these means to eradicate malaria. N II

RASHINA (M. G.) & KHOVANSKAYA (A. I.) Essai d'assainissement d'un foyer paludique (vul. Khamidié en Kabardino-Balkarie) uniquement au moyen d'un traitement médicamenteux (acriquine et plasmocide). [Attempted Control of Malaria in the Town of Khamidié by Administration of Acriquine and Plasmocide].—*Med. Parasit. & Parasitic Dis.* Moscow 1939 Vol. 8 No. 1 [In Russian pp. 9-23. With 2 figs. [16 refs.]. French summary, pp. 23-24.]

The town of Khamidié has a population of 2,000. In the spring of 1935 when these observations commenced the parasitic, splenic and endemic indices were 44.4, 44.7 and 63.7 respectively. Irrigation canals are responsible for most of the anophelines which are active for only five months in the year. During each of the years 1935-37 a medical inspection of the whole population was carried out in spring and summer and autumn. All persons found harbouring malaria parasites were treated. In the spring all those who had suffered from malaria in the previous year were treated (acriquine 0.1 gm. three times a day for five days with plasmocide 0.03 gm. twice a day on the first and third day of treatment). All acute cases were treated in the same manner. In 1937 the period of treatment was extended to seven days. During the transmission season all persons who had had malaria were given plasmocide 0.03 gm. twice a day on the first and fourth day of six-day cycles. The total number of malaria cases in the three years primary cases, reinfections and relapses were 661, 438 and 233 respectively. Of infants under two years of age the percentage that suffered from malaria in the three years was 50.4, 17.4 and 4.9 respectively. The results have thus been considerable. In view of the close contact between the population and a very active vector complete control will necessitate the adoption of anti-mosquito measures in addition to the drug treatment. N IV

BAEZA (J. I.) Partial Control of Malaria in a Localized Area by Plasmoquine.—*Jl. Malaya Branch Brit. Med. Assoc.* 1939 Mar Vol. 2 No. 4 pp. 239-243.

In an outlying part of Perak a community of 160 persons suffered severely from malaria. Anti-larval measures were not practicable. Plasmoquine as a prophylactic was given twice weekly 0.02 gm. to those over the age of three, half that dose to those of lesser age. The general improvement of health that followed was marked. At the preliminary survey in October 1935 the spleen rate was 17.8 per cent, the parasite rate 18.6 per cent and the average haemoglobin rate

64 per cent. These rates in July 1937 were 4.3, 5.1 and 72.3 respectively. The spontaneous gratitude of the people of the settlement is testimony to the value of the results achieved. A II

DUPOUX (Robert) BARTHAS (Raymond) ANTOINE (Albert) & GARALI (M. Tahar). Nouveaux résultats des expériences de prophylaxie collective antipaludique en Tunisie. [Recent Results of Experiment in Collective Antimalarial Prophylaxis in Tunisia].—*Bull Acad Med* 1939 Apr 25. 103rd Year 3rd Ser Vol. 121 No. 15 pp 591-595

The early results obtained by the mass distribution of premaline in the Cape Bon peninsula in Tunis have already been reported [see this *Bulletin* 1938 Vol. 35 pp 568-567]. This communication records the results obtained in 1937 and 1938. As before distribution of premaline was made twice each month from the 1st June to the 1st November. Those found harbouring parasites chiefly nomads visiting the district were given a curative treatment with premaline. The number of persons receiving prophylactic treatment was 27,128 in 1937 and 28,906 in 1938. No anti-mosquito measures were undertaken. The results achieved are most remarkable. In May 1938 the parasite index was 21.9 for children and 17.6 per cent for adults. In November 1938, after the epidemic season these indices had fallen to 3.5 and 2.8. In the two following years the general parasite indices were 4.3 and 0.78, and 1.6 and 0.1 determined in the same months. The fall in the splenic index was almost more striking—1936 May 67.0 November 33.4 1937 May 25.8 November 12.9 1938, May 9.9 November 1.3. It is true that the winter of 1937-38 was unusually dry but anophelines were still prevalent and malaria continued to be severe in untreated areas which served as controls. Moreover the deficient rainfall increased the immigration of nomads coming from the south who were heavily parasitized. No death was attributed to malaria in the region treated. The only cases of malaria occurred among arrivals from adjacent areas. Patients treated with premaline and subsequently submitted to the bi-monthly administration of the drug suffered no relapses. During the three years experience no toxic symptoms have been caused by the drug. The annual cost per person treated was 13.81 fr in 1937 and 15.28 fr in 1938. A II

NIVEN (J. C.) Sulphanilamides (Prontosil) in the Treatment of Malaria. —*Bull Inst Med Res Federated Malay States*. 1938. No. 4 27 pp With 6 graphs.

Eighty cases of acute malaria were treated with prontosil, and 68 cases with quinine dihydrochloride. The patients were adult Chinese or Indian, of the labouring class. All cases had temperatures of over 99°F and more than 1,000 asexual parasites per cmm. of the peripheral blood. Of the sulphanilamide cases 34 were infected with *P. falciparum*, 38 with *P. vivax* and 8 with *P. malariae*. Prontosil album (Bayer) was used, 3 gm daily in two doses. The quinine was given in a dose of 2 gm per 100 lbs body weight a day. Both drugs were given for 7 days.

Prontosil has some lethal action on plasmodia but it is much less efficient than quinine. It is more active against *P. falciparum* than against *P. vivax*. It is not an efficient gametocide either in *P. falciparum* or *P. vivax* malaria. Mosquitoes fed on 5 prontosil treated

crescent carriers at the end of the course of treatment were readily infected. No toxic effects resulted from the use of prontosil. The conclusion is reached that prontosil is not a practical addition to the therapeutic armament against malaria. It is much less efficient than quinine is more dangerous and much more costly.

A II

NIVEN (J C) Paludex in the Treatment of Subtertian Malaria.—
Bull Inst Med Res Federated Malay States 1938 No 3
13 pp With 3 charts

Ninety-one cases of subtertian malaria in the General Hospital Kuala Lumpur are the subject of report. 29 received paludex alone 30 paludex and quinine bihydrochloride and 32 quinine bihydrochloride alone. The dose of paludex given was 1.5 gm. a day and of quinine 2 gm per 100 lbs body weight. It was found that paludex is much less efficient than quinine in controlling fever and eliminating parasites from the peripheral blood. Paludex does not affect the viability of subtertian gametocytes. There is no significant difference between the effects of the combination paludex and quinine and those of quinine alone. Paludex is not an efficient remedy for infections with the local strains of *P. falciparum*.

N IV

DECOURT (Ph.) BELFORT (J) & SCHNEIDER (J) Etude de l'action de l'oxy(diméthylaminobutylamino)quinoléine sur *Plasmodium gallinaceum* et *Plasmodium falciparum*. (Action of Cillonal on *P. gallinaceum* and *P. falciparum*).—Bull Soc Path Exot 1939
Apr 4 Vol 32, No 4 pp 419-424

Oxy(diméthylaminobutylamino)quinoline belongs to the same chemical series as does plasmoquine, a salt containing 40.03 per cent. of active base has received the designations cillonal and certuna [see this Bulletin 1938 Vol 35 pp 562-564]. The authors summarize published reports on the value of this drug as a gametocide and describe their own observations. These were carried out on chickens infected with *P. gallinaceum* and on patients harbouring gametes of *P. falciparum*. The human experiments were made in a highly malarious town in Tunisia in March and April before the beginning of the transmission season. The nine patients selected showed gametes of *P. falciparum* each day during an eight-day period of observation. Eight patients each received 0.01 gm. of cillonal thrice daily for five days. The last patient received double these doses. At the end of treatment two patients out of eight still harboured gametes fifteen days later five out of eight and after five weeks all were positive. The treatment was repeated with double doses with still less satisfactory results. There were no signs of drug intolerance and there was an improvement in the general condition.

The authors conclude that cillonal is less effective than either praequine or rhodoquine. Its use has been advocated for the reason that it is less toxic than plasmoquine. They point out that rhodoquine which has been so little used by other than French workers is quite as active as praequine and has never to their knowledge given rise to alarming symptoms.

was confirmed by xenodiagnostic methods. HERR and BRUMPT (p. 146) report accidental infection of the eye by the faeces of *T. pallidipennis* (from Mexico where the disease is unknown) in Paris. Xenodiagnosis confirmed the clinical diagnosis and a new drug Bayer 7802 was used in treatment. C IV

HORNER (Imre) Studies on Serum Complement of Guinea Pigs Infected with *Trypanosoma equiperdum*.—*Jl Immunology* 1939 Aug. Vol. 37 No. 2. pp. 85-89

Trypanosomal infections in the guinea pig run a relapsing course, and the most plausible explanation is that the crises are caused by a lytic substance. The experiments recorded in the present paper are intended as a contribution to knowledge regarding the mode of function of this antibody.

The complementary titre of the serum of infected guinea pigs was observed repeatedly during the course of the disease. When trypanosomes were numerous or were increasing in the blood, the titre remained stationary up to the peak of multiplication. At the trypanosomal crisis the complement titre dropped to 1/3 or 1/4 of its previous value, but within a few days it returned to the normal level, where it remained throughout the next cycle of multiplication of the parasites.

It was found that only the middle-piece component was deficient in the complement poor serum. The author believes that the loss of complement is due to an *in vivo* antigen-antibody reaction, pointing to the existence of a trypanolytic antibody. IF Yorke

ACANFORA (G) La *Castellaniella brucei* durante le prime fasi dell'infezione sperimentale. [*Trypanosoma brucei* during the Early Stages of Experimental Infection].—*Arch Ital Sci Med Colon e Parasiti* 1939 May Vol. 20 No. 5. pp. 257-272. With 13 figs. [10 refs.]

In a study of the early phases of *Trypanosoma brucei* infection in the guinea pig it is found that after subcutaneous injection of infected blood of another animal some of the injected trypanosomes find their way into the blood either by active penetration of the capillary walls or by simple passage through lesions in vessel walls, but the majority pass to the lymphatic glands where they are destroyed. Degenerating forms of trypanosomes can be seen in smears of the glands receiving lymphatics from the inoculation site. The glands thus offer a barrier to the invasion of the blood. Similar results follow intraperitoneal injections, whereas after intravenous injection the lymphatic glands do not appear to play any part in controlling the infection. During all stages of the infection smears of the bone marrow particularly that of the long bones, show many degenerating trypanosomes, so that it would seem that the bone marrow has a constant action in suppressing the infection. C M Wenyon

VAN DEN BRANDEN Influence du froid sur l'évolution de la trypanosomose expérimentale du rat blanc infecté de *Trypanosoma brucei*. [The Influence of Cold on the Evolution of *T. brucei* Infections of White Rats].—*Ann Soc Belge de Méd Trop* 1939 June 30 Vol. 19 No. 2. pp. 213-244

In 1908 BRUMPT studied the action of cold on a dormouse infected with *T. gambiense*. The animal, after inoculation was put in a cellar

in order to hibernate. When it was withdrawn 24 days later the blood was negative. In the meantime the control animals had died of the infection. The dormice cured by hibernation did not acquire immunity as they succumbed to a second inoculation. Brumpt considered the disappearance of the trypanosomes in the hibernating animals to be due in part to a diminution in the vitality of the trypanosomes under the influence of low temperatures, and in part to a normal conservation of the physiological functions of the phagocytes. The destruction of the parasites exceeded their reproduction at low temperatures and the animal was cured.

van den Branden decided to re-investigate the matter with a strain of *T. brucei* in white rats. He had observed a survival of the inoculated rats during a period of frost in December 1938. In order to go further into the matter he put infected white rats into an ice-box at a temperature of 4 to 5°C. The control animals were kept in a warm stable where the temperature ranged from 18 to 20°C during the day to 10 to 12°C at night. The course of the disease in animals kept in the ice box was prolonged from 5 to 7 days. Subinoculation from these animals into normal animals kept in the warm stable produced the usual type of infection. No morphological change could be discovered in the trypanosomes found in the blood of the animals exposed to cold. The only effect of cold appeared to be a slight prolongation of the duration of the infection. van den Branden believes that the explanation is that under the influence of cold the resistance of the rat increases to a slight extent. II 1

ROUBAUD (E.) & PROVOST (A.) Sensibilité du lapin au trypanosome des ruminants des Antilles *Trypanosoma* souche américaine de *Trypanosoma* (*virax*). [The Susceptibility of the Rabbit to the Trypanosome of Ruminants of Antilles *Trypanosoma* American Strain of *Trypanosoma* (*virax*)]—*Bull. Soc. Path. Exot.* 1939 May 10. Vol. 32, No. 5, pp. 553-559. With 3 figs.

The authors refer in some detail to the work of BLACKLOCK and LORKE (1913) who succeeded in infecting rabbits with a strain of *T. virax* isolated from a horse infected in the Gambia. They themselves repeated these experiments using the American strain *T. viennesi* (*T. guyanense*) and obtained results similar to those obtained by Blacklock and Lorke; they conclude therefore that the differentiation of these parasites from *T. virax* no longer appears legitimate from any point of view.

III Y

NOWICKI (E.) Postmortales infekionsfähiges Ueberdauern von *Schizotrypanum cruzi*, *Trypanosoma congolense* und *Trypanosoma equinum* in Versuchstierorganen. [The Duration of Post-Mortem Infectivity of *T. cruzi*, *T. congolense* and *T. equinum* in the Host's Organs.]—*Zent. f. Bakt. I. Abt. Orig.* 1939 May 12, Vol. 143 No. 7/8, pp. 385-392.

The author has examined the post-mortem survival in various organs as judged by capacity to infect other animals of *T. cruzi*, *T. equinum* and *T. congolense*. He found that *T. cruzi* in the mouse can survive with certainty two days and sometimes three days after death; the best organ is the brain. After one day animals inoculated from all organs (liver, spleen, heart muscle and brain) became infected,

it the most rapid infection was obtained from heart muscle. *T. congense* and *T. equinum* material from dead rats as a rule failed to infect, even a day after death, and storing the organs at low temperature did not increase the survival period. Details of the experiments are given and the results are summarized in tables. W 1

OLSON (Maxwell H.) A Method for the Preservation of Viable Forms of *Trypanosoma cruzi*. [Research Notes.]—*Jl Parasitology* 1939 June. Vol. 25. No. 3 p. 282.

This note describes a simple method for a short term preservation of the viable forms of *T. cruzi*. When young rats of less than 20 days old are inoculated with *T. cruzi* they suffer an extremely intense and fatal infection. Intensity of blood infection is paralleled by extensive malarial invasion, particularly of the heart muscle and spleen. It was found that when either of these organs is removed during the peak of the blood stream infection, or immediately after the death of the animal, the leishmaniform stage of the parasite will remain viable for 10 days when kept in a sealed tube of buffered Ringer's or Locke's solution at either refrigerator or room temperature. W 1

ENECKE (Karl) & VON HALLER (Ernst) Recherches expérimentales sur le mode de transmission et le cours de l'infection par *Trypanosoma cruzi* chez les souris. (Experimental Researches on the Mode of Transmission and the Course of Infection of *T. cruzi* in the Mouse.)—*Ann. Parasit. Humains et Comparés* 1939 July 1 Vol. 17 No. 4 pp. 313-319.

In spite of the numerous researches which have been conducted on the mode of transmission of *T. cruzi*, there is still a diversity of opinion. BRUMPT (1939) and CARDOSO (1938) have recently summarized the different points of view (see this Bulletin 1939 Vol. 36 pp. 753-728).

The authors have once again returned to the subject, with a view to ascertaining whether infected Reduviids are capable of transmitting the trypanosomes to white mice solely by biting and sucking blood. They describe in considerable detail an ingenious technique in order to exclude any possibility of the infected faeces of the bugs reaching the skin of the mouse. No less than 52 experiments were conducted and in none of them did the bite of the infected bug suffice to produce infection. Certain details are given regarding differences in the course of the infection in mice produced by various Mexican strains of the parasite. W 3

BRUMPT (E.) Mode de transmission de la maladie de C. Chagas. (Method of Transmission of Chagas's Disease.)—*Ann. Parasit. Humains et Comparés* 1939 July 1 Vol. 17 No. 4 pp. 320-331. With 3 figs. [45 refs.]

Brumpt reviews this question in great detail. He points out that as long ago as 1912 he showed that a *Cercofillicus ruber* which had resisted numerous bites of *Triatoma megista* developed a fatal infection after the deposit of the infected excreta on the ocular mucosa. He also draws attention to the frequency of oedema around the eye as one of the first signs of the acute form of Chagas's disease.

After referring to the fact that CHAGAS in 1909 and 1911 had advanced the view that the infection was transmitted by the bite of the bug

Brumpt summarizes the somewhat voluminous literature bearing on these two hypotheses. Whilst the great mass of observers support Brumpt's hypothesis certain workers notably MÜHLENS DIOS PETROCCHI and ZUCCARINI [this *Bulletin* 1927 Vol 24 p 682] and CARDOSO [this *Bulletin* 1939 Vol 36 p 228] have reported that they succeeded in infecting mice by the bites of infected bugs after taking all precautions to avoid contamination by the bug's faeces. Brumpt recalls that DIAS and later HOARE [this *Bulletin* 1934 Vol 31 p 757] attempted to explain the observation of Mühlens and his collaborators on the theory that the trypanosomes had regurgitated into the biting parts from the intestine of the bug.

In a summary of Cardoso's paper the reviewer suggested that Cardoso's positive result might be explained by a contamination of the biting parts of the bug by the infective faeces of itself or another bug. Brumpt examines this hypothesis in detail. He points out that cannibalism is common and that it is interesting to note that Mühlens and his collaborators and Cardoso succeeded in infecting only a single animal and that when they later tried to obtain infections from the bites of the same bugs they failed, and that finally DENECKE and VON HALLER [*vide* above] who took the most careful precautions to avoid contamination of the mouth parts by the infective excreta failed in a long series of experiments to obtain a single infection by means of the bite.

In conclusion, Brumpt considers that the reviewer's hypothesis is well founded and is probably the correct explanation of the occasional infections which have been obtained experimentally through the bites of infected bugs. IV Y

TALICE (R. V) & OSIMANI (J. J.) Primeros mamíferos domésticos infectados por el *T. cruzi* comprobados en Fray Bentos. [Infection by *T. cruzi* of Domestic Animals in Fray Bentos.]—Reprinted from *An. Facul. de Med. Montevideo* 1939 Vol. 24 Nos. 11 & 12. 6 pp. [37 refs.]

The authors record the existence in Fray Bentos the capital town of the Rio Negro Department of a dog and three cats which they found naturally infected with *T. cruzi*. The inhabitants denied that the houses were infected with bugs but investigation proved this to be erroneous. H H S

BRUMPT (E.) MAZZOTTI (Luis) & BRUMPT (L. C.) Enquêtes épidémiologiques sur la maladie de C. Chagas au Mexique. Réduvidés vecteurs. Animaux réservoirs de virus. Cas humains. [Epidemiological Inquiries on Chagas's Disease in Mexico. Reduviid Vectors, Animal Reservoirs and Human Cases.]—*Ann. Parasit. Humain et Comparée* 1939 July 1 Vol. 17 No. 4 pp 299–312. With 1 chart & 10 figs. on 5 plates. [23 refs.]

Although the authors' work since 1932 has appeared to show that American trypanosomiasis does not exist in Mexico recent researches have shown that the disease although mild, is probably widely extended. The authors state that in Mexico there are 11 species of *Triatoma* and one species of *Rhodnius*. They have examined the most common of these and have found natural infections in *T. barberi*, *T. dimidiata*, *T. pallidipennis*, *T. phyllosoma*, *T. rubida* and *Rhodnius prolixus*.

Details are given of two human cases of the disease discovered in Mexico, and of an accidental infection with the Mexican parasite in Brumpt's laboratory in Paris.

The only animal reservoirs of the virus actually discovered in Mexico are the dog and an armadillo. A rodent *Neotoma* (*Hodomya*) *allem* the burrows of which contain numerous infected *T pallidipennis* is certainly an important reservoir and probably there are many others.

W 1

LENT (Herman) & PIFANO (Féhr) *Eutritoma nigromaculata* (Stal, 1872) N. Comb. especie venezolana encontrada infestada pelo *Schizotrypanum cruzi* (Chagas 1909) Nota prévia. [*Eutritoma nigromaculata* a Venezuelan Species naturally infected with *T cruzi*].—*Brasil Medico* 1939 July 1 Vol. 53 No. 27 pp 685-688 With 1 fig

The authors state that the species of *Triatomidae* found infected in nature by *T cruzi* amount to twenty they name ten of these *Triatoma rubrofasciata* *T dimidiata* *Psatrongylus gemiculatus*, *Eutritoma maculata* *Rhodnius prolixus* *R pictipes* *Erasyrus caespitosus* *Belminius rugulosus* *Psammolestes arthur* and *Eutritoma nigromaculata* which the authors themselves have discovered so infected and, as they intend to publish in a future paper capable of transmitting Chagas's disease experimentally. Of these ten there are four more often met with than the others viz *R prolixus* *E maculata*, *P gemiculatus* and *Ps arthur*.

H H S

PACKERMAN (Anderson) Natural Infection of *Triatoma gerstaeckeri* with *Trypanosoma cruzi* in Texas.—*Public Health Rep* 1939 Aug 25 Vol 54 No 34 pp 1547-1554 With 10 plates. [15 refs.]

This note records a natural infection of *Triatoma gerstaeckeri* collected at Three Rivers, Texas, with *T cruzi*. Of 100 bugs examined, 92 were found to be naturally infected with flagellates. A number of animals were inoculated with the trypanosomes and a description is given of the parasites in these animals.

The article which is illustrated by 10 plates contains nothing new apart from the finding of the naturally infected *Triatoma gerstaeckeri*.

W 1

MAZZOTTI (Luis) Infección natural por *Trypanosoma Cruzii* en otra especie de *Triatoma*. [Another Species of *Triatoma* found naturally infected by *Trypanosoma cruzi*].—*Medicina* Mexico 1939 June 25 Vol 19 No 342 pp 197-199 With 2 figs. English summary (9 lines)

During the past three years five species of bug have been found in Mexico naturally infected with *T cruzi* viz *Triatoma phyllosoma* *T pallidipennis* *T dimidiata* *T rubida* and *Rhodnius prolixus*. In March 1939 the author found another species of *Triatoma* naturally infected in Trapihe a town in the Nayarit State. It is illustrated in the paper but no detailed description is given and no specific name has yet been given to it.

H H S

ROMANA (C.) Utilisation de la méthode des précipitines pour l'identification du sang ingéré par certains reduviés. [Identification of the Blood Meals of Reduviids by Precipitin Tests]—*Bull Soc Path Exot* 1939 June 14 Vol 32. No 6 pp 625-628

The author has tested on *Rhodnius prolixus* and *Triatoma infestans* the precipitin method for identifying the blood meals of insects. The precipitating antisera were prepared from rabbits by Wolfe's rapid method. Under experimental conditions the blood could be recognized as late as 30 days after feeding. The method has not yet been applied in the field.
I B Wigglesworth

PESSÔA (S B) & DE BARROS (Nelson V.) Criação do *Triatoma infestans* na temperatura de estufa [Rearing *Triatoma infestans* at 37°C.]—*Folha Med* 1939 June 25 Vol 20 No 18 pp 285-287

The xenodiagnostic method is important in obscure cases of Chagas's disease and for this purpose it is best to use bugs in the 3rd or 4th moults. The average duration of evolution at the air temperature of São Paulo is given as follows: Egg to larva 25-30 days; 1st moult 45 days; 2nd 60-80 days; 3rd 120-180 days; 4th (nymph stage) 190 days; 5th (adult) 271 days; the total may be as long as 360 days. In the laboratory at room temperature the duration has been 300 days or less (220-240 days). Experimenting with two lots, one kept at room temperature and one at 37°C (the larvae being allowed to feed once or twice a week on guinea-pigs) the latter reached the adult stage in an average of 99 days (minimum 94 maximum 105) by which time the former were coming to the end of the first moult only. A second lot developed in 111 days (108 and 114 minimum and maximum respectively) and a third lot in 109 (105 and 113) in other words in about half the time in which those kept at laboratory temperature developed—valuable saving of time where many may be needed for xenodiagnosis.
H H S

KOLODVA (Maxwell H.) The Transmission of Immunity in Experimental Trypanosomiasis (*Trypanosoma cruzi*) from Mother Rats to their Offspring—*Amer J Hyg* 1939 July Vol. 30 No 1 Sect C pp 19-39 [17 refs.]

The author points out that there has been relatively little work concerning the transmission of active immunity against protozoan parasites. The work described in the present paper was designed to study the transmission of protective antibodies from mother rats actively immune to *Trypanosoma cruzi* to their offspring. The author gives the following summary of his work:—

Mother rats actively immunized against *Trypanosoma cruzi* by recovery from infection with this parasite produce circulating protective antibodies which are transmitted to their offspring. In contrast to the recognized route of transmission in other hemochorial mammals the transfer takes place principally by way of the colostrum and milk. This is indicated by the fact that normal young nursing upon immune foster mothers acquire an immunity about equal to that possessed by the young of immune mothers. Under the conditions of these experiments no evidence for placental transfer of antibodies could be found as evidenced by the fact that the young born of immune mothers but placed immediately

after birth to nurse upon a normal foster mother were just as susceptible to infection with this parasite when tested at 4 hours, 1 day, 10 days, 12 days, and 30 days of age as were normal control animals of the same age.

Mother rats passively immunized by the injection of specific rat antiserum against *Trypanosoma cruzi* are also able to transmit these protective antibodies to their young. These antibodies, sufficient in quantity to confer a high, though incomplete, degree of protection upon the young, are transmitted to them through the colostrum and milk. The placental barrier of the rat does not permit the passage of sufficient quantities of the antibodies to afford the young any measure of demonstrable resistance to infection with the homologous parasite.

On the basis of these observations, it is suggested that the rat differs from other hemochorial mammals in that the principal route by which the type of protective antibody here considered is transferred from mother to offspring is through the colostrum and milk.

The passive immunity acquired by young rats through the ingestion of milk from the immune mother and the absorption of antibodies therefrom is not sufficient to protect completely these animals from an infection with *T. cruzi* but will produce a mild and abortive infection and will generally prevent an otherwise fatal outcome.

The immunity conferred upon the young by actively immune mothers is only temporary and is demonstrable for at least 10 days after weaning. It decreases rapidly after that time.

Protective antibodies are present not only in the colostrum but also in the milk throughout the normal period of lactation (20 to 25 days). The intestines of the young are permeable to these antibodies for about 20 days after birth.

Protective antibodies can be demonstrated in the serum of the immune mother and in the sera of immune and normal young nursing upon her. No antibodies demonstrable by protection tests were found in the sera of young born of immune mothers but nursing upon normal foster mothers for 25 days.

The number of young in a litter definitely influences the degree of immunity acquired by each member of that litter. In general it may be said that the smaller the number of young in the litter the greater will be the immunity acquired by each.

It is suggested that the intensity of the infection suffered by the mother rat is reflected in the degree of immunity manifested by her young. It is also suggested that the ability of the immune mother to confer immunity upon the young diminishes with time after her recovery.

The immunity against *Trypanosoma cruzi* conferred by actively immune mother rats upon their young is specific. It affords the young no protection against a closely related trypanosome *T. lewisi*.

IV Y

TALICE (Rodolfo V.) Sobre el primer caso de enfermedad de Chagas comprobado en el estado de Rio Grande del Sur (Brasil). [The First Case of Chagas's Disease notified in the State of Rio Grande del Sur (Brazil)].—*Arch. Uruguayan de Med. Ciruj. y Especialidades* 1939 June Vol. 14 No. 6 pp. 558-566. [48 refs.]

Chagas's disease has not previously been recorded in the State of Rio Grande del Sur although 30 years have passed since Chagas first reported his discovery. Since then the disease has been found widely distributed in South America. The case here reported was a boy of 17 years living on a ranch 25 kilometres from the Uruguayan town of Rivera. He was accustomed to take his siesta under the trees or at a neighbouring ranch, and he is believed to have become infected in the

latter. When he came under the author's observation he presented the typical signs of the infection—Romaña's sign was marked, there was oedema of the lids of the left eye with dacryo-adenitis, enlargement of the left pre-auricular gland and of other glands, submaxillary, axillary and inguinal, spleen palpable and painful. Blood injected into the peritoneum of white rats was followed in 11 days by *T. cruzi* in their peripheral blood. The temperature did not rise above 38 C and recovery was steady. In 17 days the temperature was normal, spleen no longer palpable and the patient much improved in general health.

H H S

- i TALICE (R. V.) MOURIGÁN (Héctor) OSIMANI (J. J.) & FERNÁNDEZ LASCAÑO (F.) Investigaciones sobre la enfermedad de Chagas en el Uruguay. Primera observación en el país de forma subaguda no edematosa de la enfermedad de Chagas. [Chagas's Disease in Uruguay. First Subacute Case without Oedema recorded in the Country.]—Reprinted from *An. Facul. de Med. Montevideo* 1939 Vol. 24 Nos 11 & 12. 12 pp. With 4 figs & 1 chart.
- ii ——— COSTA (Radamés S.) & OSIMANI (Juan J.) Nuevos casos de enfermedad de Chagas en los departamentos de Rivera, Tacuarembó, Soriano confirmados por xenodiagnóstico. [Fresh Cases of Chagas's Disease confirmed by Xenodiagnosis.]—*Ibid.* 6 pp. With 1 fig.

i. The patient was a girl of 11 years living on a ranch in Eden Valley, Tacuarembó Department where bugs (*Triatoma infestans*) were numerous. The symptoms present were generalized gland enlargement, enlarged parotids, fever, lymphocytosis, eosinophilia in convalescence and some degree of goitre (no proof of this being trypanosomal). There was no oedema. Diagnosis was made by the xenodiagnostic method.

ii. Brief details of six more cases in children of ages ranging between 7 months and 8 years. Two of them had shown Romaña's sign in the beginning. They lived in suburbs of Tacuarembó, Mercedes and Rivera. All were confirmed by xenodiagnostic methods.

H H S

TALICE (Rodolfo V.) & FUENTE-MÉNDEZ (R.) Investigaciones sobre la enfermedad de Chagas en el Uruguay. Descripción del 15o y 17o casos uruguayos. Nuevo foco de enfermedad de Chagas en el Dpto de Soriano (zona de Agraciada). Dos formas agudas en adultos. [Chagas's Disease in Uruguay. Two Acute Cases in a New Focus in the Department of Soriano.]—Reprinted from *An. Facul. de Med. Montevideo* 1938 Vol. 23 Nos 11 & 12. 8 pp. With 6 figs. on 4 plates. [29 refs.]

TALICE (R. V.) MIRANDA (Forbertino) & COSTA (Radamés S.) Investigaciones sobre la enfermedad de Chagas en el Uruguay. Primer caso en el país de forma aguda mortal de enfermedad de Chagas. (4to caso uruguayo, observado en el Dpto de Rivera—Mina de Corrales.) [Chagas's Disease in Uruguay. Forty-First Case, seen in Mina de Corrales, Rivera Department.]—Reprinted from *An. Facul. de Med. Montevideo* 1939 Vol. 24 Nos 1 & 2. 12 pp. [33 refs.]

HERR (Annette) & BRUMPT (L.) Un cas aigu de maladie de Chagas contractée accidentellement au contact de triatomas mexicains observation et courbe fébrile. [An Acute Case of Chagas's Disease acquired accidentally from Mexican Triatoma.]—*Bull. Soc. Path. Exot.* 1939 May 10 Vol. 32. No. 5 pp 565-571 With 1 fig

This paper gives an account of the disease contracted in the laboratory of the Faculty of Medicine Paris, by one of the authors (A. H.) The victim was a young woman who 14 days after she had accidentally contaminated her right eye with the infected faeces of a bug developed pain and redness in the internal angle of the eye (dacryocystitis). Three days later she presented a swelling of the same side of the face enlarged glands and a temperature of 40°C. Although repeated searches for the trypanosome were negative the clinical diagnosis was so definite that treatment with Bayer 7602 (a preparation which has not yet been put on the market) was instituted on the 15th day of the disease. The temperature gradually subsided and by the 30th day had fallen to normal. Venodiagnosis on the 37th day confirmed the clinical diagnosis. The bug in question was *Triatoma pallidipennis* obtained from Mexico where the disease is unknown.

It is remarked that the composition of Bayer 7602 is not disclosed. The drug is rather toxic and must be used with caution. MAZZA has tried it in two cases and TORREALBA in one case and believe that it had some therapeutic value. [There does not seem to be much evidence that it had any action in the present case.] 1P Y

HELMINTHIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Trematodes

HOFF and SHAW (p. 147) report on 4 patients with mental confusion, one of whom also had paraplegia. Specific treatment for schistosomiasis cured the conditions in all and this is taken as evidence of the bilharzial nature of the cord lesion, the first instance of recognition during life.

SKROUL (p. 148) has determined the cercaricidal powers of water sterilizing (chlorination) powders under various conditions. He considers that for Army water trucks the dose in the field should be that indicated by the Horrocks test plus 2. A description of the Horrocks test is appended. BRACKETT (p. 149) uses copper carbonate in place of copper sulphate for the destruction of snails in limited bodies of water and formaldehyde for the destruction of schistosome cercariae. The former may be used by unskilled persons but the latter needs great care. Immediate wiping of the skin after immersion in water appears to have a remarkable effect in preventing schistosome dermatitis and it is suggested that the cercariae penetrate the skin when the water is evaporating.

SCHIAVI (p 150) notes details of treatment of vesical schistosomiasis.

GIOVANNOLA (p 150) records two snail hosts of *S. mansoni* in Italian East Africa

BRUMPT and LAVIER (p 151) report that man is as susceptible as the sheep to infection with *Fasciola hepatica* and quote 89 infections recorded since 1928 They describe the symptoms

Hsu and CROW (p 151) describe the cercaria of *C. sinensis* Hsu (p 152) shows that in experimental infection the majority of *Clonorchis* cysts were found about the last few vertebrae of the infected fish and suggests that this may be a site of election GALLIARD (p 152) discusses the hosts of *C. sinensis* in Tonking

PLOTNIKOV (p 152) describes the clinical effects of infection with *Opisthorchis felinus* and ZERCHANINOV (p 152) gives details of the blood changes eosinophilia is the most prominent feature MIRONOVA (p 153) reports that eggs were found in 7.5 per cent of 501 faecal examinations in Russia.

Eggs of *Paragonimus westermani* were found in an abdominal abscess by KO (p 153)

SANDGROUND & PRAWIROHARDJO (p 153) found 180 specimens of *Echinostoma ilocanum* in a dead insane native in Java They think the infection more widespread than is generally supposed SANDGROUND (p 153) has investigated the life-cycle of this trematode in Java Rats have been infected by feeding with infected snails and 22 human cases in lunatics were diagnosed by faecal examination C II

HOFF (Hans) & SHAW (J. A.) Nervous and Mental Manifestations of Bilharziasis and their Treatment.—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol. 33 No 1 pp 107-111

In 4 persons one with myelitis and all with mental confusion specific treatment for bilharziasis cured the conditions.

In the man with myelitis the symptoms came on suddenly his legs giving way Three days later he was semistuporous with mental confusion cranial nerves with normal reactions optic discs normal no cerebellar signs right arm slightly weaker than left and with slightly increased reflexes complete paraplegia of lower limbs with loss of tone of all deep reflexes while the plantar reflexes were extensor and there was lessened sensation of pain and temperature in the left lower limb The liver was greatly enlarged there was eosinophilia to 18 per cent the urine was normal but there were ova of *S. haematobium* in the faeces and bilharzial lesions in the rectum In hospital the mental confusion cleared there was on the whole some betterment of the nervous symptoms at first When it ceased foudadin was given in the hope that the lesion was bilharzial under this drug improvement continued so that he became able to walk freely if stiffly without a stick This evidence that the lesion was bilharzial points the authors suggest to this being the first instance of the recognition of bilharzial infection of the cord during life He had never complained of bilharzial symptoms urinary or rectal The cure of the confusional state was effected by foudadin in all but one and after its failure in him to improve the mental state or the urine which was also affected, tartar emetic was tried and after 21 grammes had been given the mental symptoms began to clear and the urine to become free.

Clayton Lane

LAVIER (G) La pathologie des bilharzioses à *Schistosoma haematobium* et *S. mansoni* à la lumière des travaux récents. [The Light thrown by Recent Work on the Pathology of Infection with *S. haematobium* and *S. mansoni*]—*Ann de Méd et de Pharm. Colon.* 1936 Jan.-Feb.-Mar Vol. 37 No. 1 pp. 5-26. [96 refs.]

A useful summary for French readers of recent work on the pathology of schistosomiasis. Its ground is familiar to readers of this *Bulletin*.

C. L.

SPROULE (J. C.) Superchlorination of Water in the Field—Effect on Cercariae.—*Jl Roy Army Med Corps* 1939 June Vol. 72 No. 8. pp. 384-388.

The Horrocks test* was used in this investigation. The author points out that there are many variants in work of this kind—the criterion of death of the cercariae—temperature—age of cercariae—used pH value of the water and the amount of foreign matter in it—which may have influenced the findings of other workers. He used water from many sources, filtered and unfiltered, and attempted conditions as nearly as possible those experienced in the field. His conclusions are—

"It was desired to discover the value of "x" in the formula H plus "x" = dead cercariae in 15 minutes. It was found that "x" varied from 0 to 4 and it is considered that if "x" has to be fixed it will be somewhere in the vicinity of H plus 6 but even this is not certain. It was found however that when using water sterilising powder containing 23.85 per cent. chlorine and working in a range of temperatures between 27.5 and 6°C the dose indicated by the Horrocks test plus one was lethal to cercariae in 30 minutes or less, and that these tests bore a definite relation to one another.

"All these tests were carried out in a laboratory where thorough mixing was ensured of the water-sterilising powder solution and the water which was being tested.

"Until a more perfect mixing device is fitted to Army water trucks it is felt that some margin must be left in the dose for possible error or human

The following description of the Horrocks test is taken verbatim from the Extra Pharmacopoeia, Martindale, Vol. II, 21st Ed., p. 746—

Water Sterilisation for Army Use.

Horrocks's Water Testing Method is used to determine the amount of bleaching powder required to sterilise the contents of an army water-cart.

The method uses zinc iodide, or potassium iodide and starch solution, as reagent.—Compare *Field Sanitation* by Moor and Cooper (Baillière Tindall and Cox).

"The test automatically adjusts the strength of the powder to be used, to the particular water to be treated. The Horrocks's Test Case contains 6 white enamelled tumblers (170 ml) and 1 black one (250 ml). Bleaching powder—a levigated scoopful of about 2 g.—is rubbed fine and dissolved in the black tumbler filled to the inside mark. The white tumblers are filled with the water to be tested. One drop (1/15 ml.) of bleaching powder solution is added to No. 1, two drops to No. 2, up to 6 drops in No. 6. These are stirred and left for 20 minutes, when about 6 drops of a stock solution of potassium iodide and starch are added to each. A blue colour will indicate that after all organic matter has been destroyed an excess of available chlorine remains whereby iodine is liberated, with the formation of the blue iodide of starch. The number of the first army of the series which shows a definite colour gives the number of scoops of the bleaching powder required to sterilise the contents of one water-cart (110 gallons approx.) The powder should be dissolved before adding it to the water-cart, and contact for one hour should be allowed, before the water is issued to the troops.

frailty. It is therefore recommended that, if the contact period of half an hour is accepted the dose to be used in the field when working with fresh water-sterilizing powder should be that indicated by the Horrocks test plus two.

[See also this *Bulletin* 1938 Vol. 35 p. 600]

C II

BRACKETT (Sterling) Methods for controlling Schistosome Dermatitis
—*Jl Amer Med Assoc* 1939 July 8 Vol. 113 No. 2
pp. 117-121 With 1 fig. [16 refs.]

Copper carbonate is recommended as a chemical to replace copper sulfate for killing snails in the control of schistosome dermatitis because it may be used safely by relatively unskilled persons and one application may be sufficient. Chemical treatment for destroying snails may be effective only in small isolated bodies of water or in larger lakes where the snails are concentrated in beds. In larger lakes where the snails are too widely distributed to be destroyed it is suggested that the cercariae may be killed daily with solution of formaldehyde if enough cases of dermatitis occur to justify the procedure. This substance must be used with extreme care. Where these methods of control are unavailable or impracticable or the number of cases of dermatitis too few vigorous wiping immediately after coming from infested water may be a useful prophylaxis.

The following rule may be used in determining approximately the amount of copper carbonate to be added to the water. Calculate the number of cubic feet of water overlying the area to be treated and multiply this number by 0.0003 pound. This will give approximately the number of pounds of the copper carbonate necessary to saturate the volume of water in question. In our experiments so far my associates and I have used about four times this amount in order to secure an excess which would serve as a constant source of copper ions. This estimate is merely a guess at the amount of excess necessary but it seems to be satisfactory. If the material used is a commercial grade which is not 100 per cent. copper carbonate the difference will have to be accounted for by using a proportionately larger amount. There is no reason why the most inexpensive grade obtainable should not be used unless it contains dangerous impurities.

In addition to this advice for the chemical killing of snails another rule is given for calculating the amount of formaldehyde needed to kill free cercariae. The good effect of mere drying the skin immediately on coming out of the water is shown by this experiment.

For this test, numbers of *Cercaria stagnicola* that had recently emerged from beach snails *Stagnicola emarginata* were placed in a pail of water. Both feet of the experimental subject were immersed in the water for ten minutes and then removed. The left foot was wiped dry while the other was allowed to dry by evaporation. Severe itching was soon felt on the right foot but not on the left. By the next day about 120 lesions could be counted on the right foot, which had not been wiped and only one on the foot that had been wiped. From this study it is concluded that schistosome cercariae penetrate the skin of human beings largely, if not entirely when the water is evaporating.

C L

RAFAEL RÍSPUEZ (Jesús) Notas para la historia de la bilharziosis en Venezuela. [On the History of Bilharziasis in Venezuela].—*Gac Med de Caracas* 1939 Mar. 31 Vol. 46 No. 6 pp. 88-91

ALCAY (L.) MARILL (F.) MUSSO (J.) & CASTRYCK (R.) Découverte d'un foyer de bilharziose vésicale autochtone en Algérie. [A Focus of Vesical Bilharziasis in Algeria.]—*Bull Soc Path. Exot* 1939, June 14 Vol 32, No 6, pp 608-612. With 3 figs.

The place is Saint Aimé-de-la Djdjoulia, a village of 1 729 inhabitants. The urines of 96 males were examined there. In 42 of them the ova of *S. haematobium* were found in 10 more there was blood, in 44 the examinations were negative
C L.

BERNARD (L.) ALCAY (L.) GUIBONI (F.) & MANYA Note sur un cas de bilharziose urinaire algérienne [A Case of Urinary Bilharziasis in Algeria.]—*Bull Soc Path. Exot* 1939 June 14 Vol 32, No 6 pp 606-607

DARTEVELDE (Edmond) Sur les mollusques de deux foyers à bilharziose du Bas-Congo [The Molluscs of Two Bilharzial Foci in the Lower Congo]—*Ann Soc. Belge de Méd Trop* 1939 June 30 Vol 19 No 2, pp 157-160

The two foci of vesical bilharziasis are Kimpata and Mateba. Among the snails found in the former was *Physopsis africana* it was not found in the latter and the intermediate host there remained doubtful
C L.

SCHIAVI (Ciriaco) La bilharziose vescicale nel Fezzan—note di profilassi, clinica e terapia. [Vesical Schistosomiasis in Fezzan.]—*Arch Ital Sci Med Colon. e Parasiti* 1939 Apr Vol 20 No 4 pp 206-211

In 40 cases treatment has been by intravenous injection, every third day of stibonal (0.018 gram of antimony to the cc.) given fasting in a first dose of $\frac{1}{2}$ cc. rising by increments of $\frac{1}{2}$ cc. to 3 cc. in adults and 1 cc. in children, the course comprising 20 injections while on one of the intermediate days was given an intramuscular injection of sodium formate and glycerophosphate and on the other one of lecithin. An injection is apt to be followed, particularly in adults, by coughing alteration in pulse rate transitory spasm of the glottis and some clouding of consciousness. In 35 other cases there was a course of intramuscular emetine hydrochloride made up of 5 daily injections and 5 days without treatment, the course taking a month and being repeated after a month's pause the adult dose being 8 cgm. Prevention and the clinical signs and symptoms are also considered
C L.

GIOVANNOLA (Arnaldo) Ospiti intermedi dello *Schistosoma mansoni* in Africa Orientale Italiana [Intermediate Host of *S. mansoni* in Italian East Africa.]—*Riv di Parasiti* Rome 1939 July Vol 3 No 2 pp 139-144 With 2 figs. & 1 plate. English summary (5 lines)

The A. establishes the fact, that in Eritrea the *Schistosoma mansoni* is transmitted by the *Planorbis reppelli* (DUNCKER 1848) and in Harar (Ethiopia) is transmitted by the *Planorbis adonensis* (BOUGUIGNIER 1879). He reports a few characteristics which make possible the identification of the two snails by their shells.

GIOVANNOLA (Arnaldo) Schistosomiasi intestinale da *S. mansoni* nell'Harar e sua trasmissione [Presence and Transmission of Intestinal Infection with *S. mansoni* in Harar]—*Rendiconti Istituto di Sanità Pubblica* Rome 1938 Vol. 1 Pt 3 pp 805-810 With 1 fig

In November 1938 there were observed what are held to be the first instances in Harar of infection by *S. mansoni*. It affected the bowel.

Two brothers of 12 and 10 suffered from itching of the skin after bathing a month earlier in a particular pool in a partly dried water course. They both had in their faeces ova of *S. mansoni*. That pool contained a *Planorbis adowensis* and a certain number of them were then collected and verified confidently as negative. Of them 34 were placed in dilute faeces got from one of the brothers. 30 days later 3 of them began to emit cercariae of *S. mansoni* the first instance it is held of this snail being an intermediate host of *S. mansoni*. C L

BRUMPT (E) & LAVIER (G) Prophylaxie de la distomatose hépatique humaine due à la grande douve [Prophylaxis of Human Infection by *Fasciola hepatica*]—*Bull Acad Méd* 1939 June 20 103rd Year Vol. 121 No 23 pp 843-846 With 1 map

The writers know of 89 infections of man by *Fasciola hepatica* reported in the literature since 1928 and discuss its prevention.

They hold that man is as susceptible to infection as the sheep and that he gets his infection from eating raw watercress growing in places to which sheep have access, the miracidium which had escaped from the eggs passed by the sheep having encysted on the cress. This vegetable if grown in proper nurseries chemically manured and from which sheep are excluded is safe. The increase of infection noted latterly has it is held, been due to more general faecal examinations in persons suspected of this infection and not to any spread of the disease though it is the case that the consumption of watercress has increased. The early symptoms before eggs appear and while the larval fluke is establishing itself in the liver are fever a toxæmic appearance a very painful liver and sometimes signs at the base of the right lung. These disappear and with the flukes matured and settled in the bile passages there is evidence perhaps intermittent, of inflammation of these passages and there are eggs in the faeces.

C L

Hsu (H F) & Chow (C Y) Development of *Clonorchis sinensis* Eggs to Cercaria Stage in Laboratory Bred Snails, *Bithynia fuchsiana*—*Proc Soc Experim Biol & Med* 1939 May Vol 41 No 1 pp 158-160

The snails used were laboratory bred as well as young

The cercaria experimentally produced in our snails is an oculate lophocercous one. The oral sucker is protrusible. On the dorsal margin of the mouth opening there are 4 small, penetrating teeth arranged closely in a horizontal row and in addition there are 3 other horizontal rows of minute teeth in that region. The cephalic glands are 14 in number and their ducts are arranged in 4 groups in the formula, 3+4+4+3 and open into the dorsal margin of the mouth opening. The outer margin of the ventral sucker is not well differentiated. The tail possesses a dorso-ventral fin along its posterior half.

" From the above description, it is evident that while the important characteristics of the *Clonorchis* cercaria experimentally produced in our snails do not agree with those described by Muto and Fanst and Khaw they do agree well with those given by Yamaguti, and therefore we may conclude that Yamaguti's description is certainly based on a study of the genuine cercaria of *C. sinensis*.
C L.

Hsu (H. F.) Studies on Certain Problems of *Clonorchis sinensis*. VII. Further Advance in the Study of the Life-Cycle of *Clonorchis sinensis*.—*Chinese Med J* 1939 June. Vol. 55 No. 6 pp. 542-545 With 2 figs.

In a controlled experiment *Pseudorasbora parva* was infected with *Clonorchis*, to the extent of 351 cysts in a fish 28 mm. long and weighing 0.36 gram. Most of the cysts were found about the last few vertebrae and it is suggested that this may be a site of election and worthy of special search in larger fish.
C L.

GALLIARD (H.) Recherches sur l'étiologie de la distomatose hépatique au Tonkin. [On the Causation of Distomatosis of the Liver at Tonking].—*Ann. Parasit. Humains et Comparés* 1939 May 1 Vol. 17 No. 3 pp. 236-244 With 1 text fig & 4 figs. on 2 plates. [15 refs.]

The fluke considered is *Clonorchis sinensis*. The cercaria has been found in 4 of 600 *Bithynia chapera* and in 1 of 250 *Melania tuberculata* the former being by far the more abundant is the more important and its absence from the higher parts of Tonking explains the localization of the infection to the Delta. The metacercariae have been found in the fish *Catloc brevicauda* and it is suspected that *Cerastius suratus* the classical host, and *Anabas scandens* are also implicated.
C L.

ПЛОТНИКОВ (N. N.) La clinique de l'opisthorchiose. [The Clinical Side of Opisthorchiasis Infection].—*Med. Parasit. & Parasitic Dis.* Moscow 1939 Vol. 8. No. 1 [In Russian pp. 69-77 French summary p. 77]

The symptoms found in 191 cases of infection attributed to *Opisthorchis felinus* were chronic inflammation of the gall bladder and bile ducts, leading up to cirrhosis of the liver. Chronic pancreatitis is common and the author has found 1 to 78 of the flukes in 96 per cent. of the infected persons. He refers to the parasite as *O. tenuicollis felinus* (Rivolta, 1894) [The prior designations were *Distoma tenuicollis* Rudolphi 1819 *Distoma felinum* Rivolta, 1884 *Opisthorchis tenuicollis-felinus* Looss, 1899. See Hygienic Laboratory Bulletin No. 37 Washington by STILES and HASSALL.]
C L.

ЗЕРЧАНИНОВ (L. K.) Le tableau du sang en présence de l'opisthorchiose. [Blood Picture in *O. felinus* Infection].—*Med. Parasit. & Parasitic Dis.* Moscow 1939 Vol. 8. No. 2. [In Russian pp. 210-219 With 4 figs. [12 refs.] French summary pp. 219-220]

The result of blood examinations of 147 of the inhabitants of Tobolsk infected with *Opisthorchis felinus*.

In 22 per cent. of them there was anaemia, though in infected guinea-pigs the amount of haemoglobin was increased from the 10th

day onwards the number of red cells remaining normal. There was little change in the white cells except for eosinophils which were increased to as much as 67.4 per cent the maximum having been found on the 25th to 27th day, the numbers then decreasing. In 2 of 46 examined there was urobilin in the blood. C L

MIROVONA (M N) *L. opisthorchosis* dans la région de Dnjepetrovsk (District de Nikopol) [*Opisthorchis* Infection in Dnjepetrovsk.]—*Med Parasit & Parasitic Dis* Moscow 1939 Vol. 8 No 1 [In Russian pp. 64-68 French summary p. 68.]

Eggs identified as those of *Opisthorchis felinus* were found in 7.5 per cent of 501 faecal examinations. The propagation of the parasite is attributed to eating freshly salted or freshly dried fish. C L

LAVIER (G) BARETTY (M) CAROLI (J) & BOULANGER (P) *Distomatose hépatique et syndrome de Loeffler* [*Distomiasis of the Liver and Loeffler's Syndrome*.]—*Bull et Mém Soc Méd Hôp de Paris* 1939 May 15 55th Year 3rd Ser No 15 pp 739-745 With 1 fig

Ko (Eisho) *Paragonimus Westermani*: Abscess in Lower Abdominal Wall.—*Taiwan Igakkai Zasshi* [*Jl Med Assoc Formosa*] 1939 Apr Vol 38 No 4 [In Japanese pp. 539-543 With 1 fig English summary p. 544]

The eggs of this fluke were found in discharge from an abscess on the left side of the lower abdomen and in the sputum. C L

SANDGROUND (J H) & PRAWIROHARDJO (Soewadji) On the Occurrence of Human *Echinostomiasis* in Java. Preliminary Report.—*Geneesk Tijdschr v Nederl Indië* 1939 June 13. Vol. 79 No 24 pp 1497-1503. With 3 figs. on 1 plate

Echinostoma ilocanum (GARRISON) 1903, a trematode parasite of the alimentary tract of man is well known from certain localized areas in the north western provinces in the island of Luzon (Philippines).

The finding by BRUG and TESCH (1937) of eggs corresponding with those of *E. ilocanum* in the faeces of a large proportion of the inhabitants of the region of Lake Lindoe (Central Celebes) suggested that this parasite is more widely distributed, but since the adult worms were not secured for positive identification by BRUG and TESCH the question remained undecided.

A case is here reported where at autopsy in the Pathological Institute at Batavia, 190 specimens of *E. ilocanum* were found in the small intestine of an insane native who had always lived in Java.

Investigations on the life-history of the parasite are now being undertaken.

SANDGROUND (J H) On the Occurrence of Human *Echinostomiasis* in Java. II. The Discovery of an Endemic Focus of Infection with *Echinostoma ilocanum* and the Elucidation of the Parasite's Life-cycle.—*Geneesk Tijdschr v Nederl Indië* 1939 July 11 Vol. 79 No. 28. pp 1722-1734 With 9 figs. on 1 plate.

"After outlining the life-cycle of *Echinostoma ilocanum* as traced by TUBANGUI and PASCO (1933) in the Philippine Islands [this *Bulletin* 1934 Vol. 31 p. 378] the author describes his own observations and experiments on the life-cycle of this parasite in Java.

The early developmental stages have been found naturally occurring in a large proportion of the planorboid snail *Amnis (G) coneriusculus* Hutt., collected in a small pool at Bronbeek—a suburb of Batavia. Cercariae discharged from this species of snail proceed to penetrate and encyst as metacercariae in other snails, chief among which are *Lymnaea rubiginosa brevis* Mous, *L. niparvus javanicus* Phil. and *Physa conica* Gray. All of these species of snails occur living in close association with each other and all have been found naturally infected with echinostome metacercariae in the same pools.

Laboratory raised white rats have been experimentally fed with the above named snails which were found carrying metacercariae in nature and have become infected with *Echinostoma skraupii*.

A transient human infection with *Echinostomes* was induced by ingesting metacercariae from *Amnis (G) coneriusculus*. A large proportion of field rats *Rattus v. brevicaudatus* harbour the same parasite.

By using a sedimentation method for concentrating eggs in the faeces, 22 cases of human echinostomiasis were diagnosed among lunatics at the Lenteng Agoeng Rural Colony for the insane outside Batavia.

"On treatment of eleven cases of human echinostomiasis with 2 to 4.5 cc of tetrachlorethylene (C_2Cl_4) patients have passed from 13 to over 270 worms."

Attendants at the lunatic asylum and members of the normal population living near Lenteng Agoeng have not been found infected with echinostomes on account of differences in food habits and culinary practices.

"The consumption by lunatics of uncooked snails has been directly witnessed."

The sedimentation method consisted in filtering through an ordinary wire tea-strainer a suspension of faeces in water having a strength of 1 in 10 to 1 in 25 standing the suspension in a 100 cc. conical urine sedimenting glass and pipetting off the sediment after ten minutes.

C. L.

TUNAGGI (Marco A.) & AFRECA (Candido M.). The Systematic Position of Some Trematodes reported from the Philippines.—*Philippine J. Sci.* 1933 Oct Vol. 67 No. 2 pp 117-127 With 3 figs. [12 refs.]

REVIEWS AND NOTICES

GIORDANO (Mario) [Colonnello Medico della Regia Marina] *Patologia e parassitologia dei paesi caldi*. [Pathology and Parasitology of Warm Climates]. Second Edition revised and enlarged from First Edition by G. FRANCHINI & M. GIORDANO—pp xxiv+1016 With 592 figs. (12 coloured) and 3 coloured plates. 1940. Milan-Rome. Editoriale "Arte e Storia" [L. 180].

For an author to undertake single-handed the preparation of a work on the *Pathology and Parasitology of Warm Climates* would appear to be a veritable labour of Hercules and, in the reviewer's opinion the work has on the whole been accomplished with success. In these days tropical medicine tropical parasitology and tropical pathology cover so extensive a field that no one author can be expected to be able to cultivate it all equally and consequently it is but natural to find inequalities of accomplishment in a work which attempts to deal with so much.

In the space at our disposal it is not possible to review in detail a book of more than a thousand pages which deals with animal as well as human parasites with the diseases which they convey or give rise to the symptoms pathology and treatment of these diseases. We can do little more than tell of the contents and indicate a few of the points which particularly recommend the work to those practising in warm climates.

The book is a revision and amplification of a work by FRANCHINI and the present author. As we have not seen this we cannot say what revision and how much amplification have been carried out. In the preface the author states that he classifies and describes the chief parasites vectors of disease limiting his remarks to what is of practical value to the medical man. He has done this and more for animal parasites have been included quite apart from their human application.

The whole is divided into ten main parts with preliminary chapters on climatology and on the hygiene of colonies and of expeditions military and exploratory and an appendix of a hundred pages on health legislation. Part I concerns *Protozoology* and is subdivided into seven chapters treating of *spirochaetes* the dysenteries and amoebiasis leishmaniasis and the flagellates the Sporozoa including not only the *Plasmodia* in detail but notes also on *Haemoproteus*, *Leucocytozoon*, *Haemogregarines*, *Piroplasma*, *Theileria* and others. As one expects, in an Italian work human trypanosomes are given the generic name of *Castellanella* those infecting animals still retain their name. It is peculiar to see *Plasmodium fenne* given validity as a species. *Pl. ovale* is mentioned but not described. Therapeutic malaria is referred to but very inadequately being discussed in half a page. Bejel is not referred to in the yaws or any other section. A brief page is given to *Cnidosporidia* and a short chapter to *Balantidia* followed by one on parasites of doubtful classification—*Bartonella*, *Rickettsia* and the diseases associated therewith. In the account of endemic typhus nothing is said of Lewthwaite's important studies in Malaya.

Part II *Helminthology* follows the usual lines describing the nematodes and flatworms—trematodes and cestodes—and containing a chapter on examination for and preservation of ova and an appendix on Annelidae. The illustration on p. 388 gives the ovum of *Ancylostoma duodenale* a double wall that on p. 392 is better. Part III *Entomology* is clearly written full enough but not too detailed describing the various Orders Suborders Families Genera and Species of importance and the diseases they convey also others of interest though of less importance together with a serviceable appendix on dissecting preparing and mounting insects. Part IV on *Poisons of Animal and Vegetal Origin* is the least satisfactory in the book. It is of course impossible to give more than the briefest sketch of the various snakes (*Crotalines* are disposed of in a couple of lines) the symptoms and treatment of snake-bite (scorpions centipedes and millipedes are dealt with in the Entomological Part in a chapter on Poisonous Arthropods) poisonous fish the vegetal and arrow poisons in thirty pages. The illustrations are numerous 44 in this section and very good and compensate to some extent for the poverty of the letterpress. Part V *Bacterial Diseases* is *multum in parvo*. In 82 pages are described the bacterial dermatoses leprosy enteric fevers bacillary dysentery plague cholera tularaemia, undulant fever

DÉROBERT (L.) [Ancien Chef de Laboratoire à la Faculté de Médecine de Paris] *Les troubles de la thermorégulation (coup de chaleur)* [The Disorders of Heat Regulation (Heat Stroke)]—218 pp. With 8 plates & 5 figs. 1939. Paris. Masson et Cie 120 Boulevard Saint-Germain. [60 fr.] [Review appears also in *Bulletin of Hygiene*]

This work treats very fully of the pathology of disorders of heat regulation particularly with regard to heat-stroke. The author first surveys the salient facts of heat control in the human body and summarizes the physiological effects of exposure to high temperatures. The author seems to give unqualified credence to the theory of "secondary chemical regulation" of heat production. The belief in the inhibition of metabolism at high temperature has not as yet obtained general support.

The physiological sections are followed by descriptions and classification of the considerable number of clinical conditions in which hyperpyrexia is an outstanding feature. In this useful chapter the author deals with hyperthermia induced by a variety of physical, chemical and hormonal agencies, fever and heat-stroke and its allied syndromes.

The theme which gives this book its interest is the pathogenesis of heat-stroke. After discussing the current theories the author describes his own experiments on animals exposed to high temperatures. The histopathological findings lead him to the conclusion that the essential phenomena of heat-stroke are to be accounted for by the disintegration of protein. He regards the heat-stroke syndrome as closely related to anaphylactic and protein shock. The resemblances of the symptoms to surgical shock and the condition of collapse following extensive burns are also discussed.

The author has marshalled considerable evidence for his view. On his hypothesis he has most interesting explanations for such questions as acclimatization to heat and the immunity to heat stroke achieved by DEPOSTI on the Witwatersrand by giving new mine workers a preliminary exposure to hot conditions more severe than those encountered subsequently in the working places.

J. S. Wiener

DUBOIS (A.) [Professeur à l'Institut de Médecine Tropicale Prince Léopold] *La Lèpre. Diagnostic—traitement—prophylaxie.* [Leprosy. Diagnosis—Treatment—Prophylaxis.]—106 pp. With 25 figs. 1939. Brussels. Imprimerie Industrielle et Financière 47 rue du Houblon. [15 fr.]

This small book is written as a practical guide to medical men engaged in the struggle against leprosy in the Belgian Congo where the author has worked for years and paid especial attention to that disease.

A brief historical chapter is followed by one on distribution which is mainly concerned with the Belgian Congo where the number of cases is given as 60 000 or 5.5 per mille—a much lower figure than the usually accepted one of about 200 000. A short bacteriological section is in accordance with accepted views. The important subject of epidemiology is dealt with more fully and the relation between a dense population and high leprosy rates is emphasized. In another place

the close relationship between high leprosy rates and high rainfall in India especially is quoted and it is pointed out that the exceptionally high leprosy rate in the Nepoko province of the Belgian Congo is associated with high rainfall and a low state of morality. In quoting the table of Rogers of 700 cases in which the source of infection was traced the author makes a slight slip in saying these were cases in India for they were collected from several decades of world wide literature. This chapter is well up to date. The author records that very little fish is eaten in the badly infected Nepoko area. The recommendations concerning epidemiological enquiries of the Cairo Congress of last year are quoted. A short account of the evolution histology and biochemistry follow and absence of any reliable serological test of diagnostic importance is pointed out and the prognostic value of the leprolin test is mentioned. All the foregoing sections include the important established facts in a succinct form.

The clinical section is rightly given most space in a practical book and it is well illustrated by photographs of the disease in different stages as seen in the Negro race. Special attention is paid to the early symptoms and to the importance of early recognition of the disease. Short chapters on diagnosis and prognosis are followed by a fuller one on treatment. This is a good summary of the subject and the now generally accepted view that only the chaulmoogra derivatives have been proved to be of curative value is endorsed. Notes on pharmacology are followed by clear directions on dosage and the methods of using these preparations. The concluding section on prophylaxis makes it clear that in the case of the Belgian Congo accommodation in agricultural villages near a dispensary to allow of treatment is the most practical plan and they now provide for one-third of the known cases.

Altogether this little book is practical and up to date and reveals the author's knowledge of British and American as well as of French work on the subject.

L. Rogers

Buxton (Patrick A.) [M.A. M.R.C.S. L.R.C.P. D.T.M. & H. Director Department of Medical Entomology, London School of Hygiene and Tropical Medicine. Professor of Medical Entomology, University of London]. *The Louse, An Account of the Lice which Infest Man, their Medical Importance and Control*—pp. ix+115. With 28 figs. 1939. London. Edward Arnold & Co. [7s. 6d.] [Review appears also in *Bulletin of Hygiene*]

The war of 1914-18 called forth in all countries an immense output of research on the louse—its biology and the best means of combating it under war conditions. The 20 years which followed, although they have added much to our knowledge of the louse-borne diseases, have added almost nothing to the efficacy of existing methods of louse control. With the renewed outbreak of war the louse will again become a military problem—how important a problem will depend upon which of the louse borne diseases make their appearance among the troops. Already the evacuation of children from the large towns has brought a realization of how widespread is infestation with head lice among the civil population of this country. It is singularly fortunate therefore that just at this moment Professor P. A. Buxton has been able to produce a monograph on the louse which brings together all the scattered information on this subject which everyone who has to deal with lice will wish to know. The author states in his

preface that this work formed part of a book on medical entomology which is in preparation, but it has been adapted to form a complete book in itself.

The author accepts the view that the head-lice and body-lice are closely related physiological races of a single species *Pediculus humanus*. For most purposes they may therefore be considered as one. Their external and internal anatomy and their physiology are described. Their biology is considered in two sections dealing with individual biology and collective biology. The former consists in the relation of the physiology of the louse to its reactions in its environment and to the range of conditions under which it is capable of existence. The collective biology is the study of populations of lice and the fluctuations to which these are subject. It is in this field that Professor Buxton has himself contributed most in recent years and it is particularly valuable to have a lucid summary of his conclusions to date. The relation of lice to relapsing fever typhus and trench fever is fully described and the value of this part of the book is much increased by an up-to-date account of the development of the Rickettsias and *Spirochaetes* in the louse, and short comparative descriptions of murine typhus and the tick-borne relapsing fevers. The chapter on control contains both a systematic account of the insecticidal methods applicable to the louse and a discussion of the practical measures for utilizing these methods in different circumstances. Many gaps in our knowledge on all these matters are pointed out. A chapter on the crab louse, *Phthirus* and an appendix on the technique of rearing lice for experimental purposes conclude the book. The volume is nicely illustrated with drawings by Mr H. S. Leeson. It is crammed with facts set out in a readable form and is destined to become the *code mecum* of everyone who is called upon to deal with lice from whatever point of view.

V. B. Wigglesworth.

TROPICAL DISEASES BULLETIN

Vol 37]

1940

[No 3.

SUMMARY OF RECENT ABSTRACTS *

III MALARIA

Epidemiology

General—Malaria surveys are reported from Algeria (p 388) Eritrea (p 488) Abyssinia (p 677) Italian Somaliland (p 678) Tanganyika (pp 126 387) Lourenço Marques (p. 488) the Belgian Congo (pp 777 778) the Bahrein Islands (p 678) Kutch State (p 9) Manbhum (p 9) the Madras Presidency (p 131) Tonking (p 131) Saigon (p 679) Laos (p 389) the New Hebrides (p 918) the Philippines (p 8) and British Guiana (p 809). Relevant parts of these are abstracted below but those interested in methods used and results obtained in surveys as a whole should refer to the pages noted.

With reference to the study of epidemiological conditions DECOURT (p 818) states that splenic splenometric and parasite indexes should be recorded in adults as well as children. The incidence of febrile attacks mortality still-births and the effects of morbidity on social and economic life should be studied, and serometric indexes may give valuable immunological information. SCHÜFFNER (p 129) in a paper first published in 1919 also stresses the importance of recording the degree of splenic enlargement in estimations of spleen rates and of the inclusion of adults in such surveys. Thus carried out spleen rates give invaluable information, but blood examinations are also necessary.

RUSSELL (p 787) shows how the failure to integrate in practice the knowledge of the problems of irrigation and those of malaria in India has led to the increasing incidence of malaria due to irrigation schemes. But he points out that it is *defective* irrigation which is at fault and gives a list of common practices which lead to the production of malaria. Of these, perhaps the most important are the absence of drainage canals and general untidiness through neglect of proper maintenance and planning of canals and channels. Subsoil water has in places risen greatly through the effects of barrage construction. SWEET (p 808) points out that in Mysore minor irrigation from tanks which depend on rainfall produces little or no malaria. Larger

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

projects from tanks which never go dry, and from which a system of canals is led are often associated with malaria of some severity. Extensive river irrigation is invariably responsible for much malaria.

KINGSBURY (p. 128) refers to the part played by meteorological conditions, the replanting of rubber and the immigration of large numbers of non-immune labourers in the epidemiology of malaria on estates in Malaya.

PINTO (p. 1006) shows how the introduction of *A. gambiae* into S. America in 1928-1930 was followed by a local epidemic and that in 1938 there occurred a widespread epidemic throughout the greater part of N. Brazil in which the deaths were estimated at more than 20 000. He (p. 680) reports a case mortality of 6 to 15 per cent. Ships were probably responsible for the introduction of *A. gambiae* from W. Africa, but its further spread may be effected by aircraft.

Distribution—TANGUY (p. 817) records the case of a woman and her husband who contracted malaria in France near Fréjus.

In central Russia SARIKJAN (p. 677) reports that the majority of primary attacks in infants occur in the first half of the year more especially in the second quarter. This is probably attributable to the large proportion of cases with prolonged incubation periods or to infection from mosquitoes which have been hibernating.

SCHWETZ and BAUMANN (p. 777) found that at Coquilhatville on the river Congo the degree of infection of children was low and that of adults higher, an unusual finding in the Congo. Malaria is only very feebly endemic and although mosquitoes are numerous *A. gambiae* was not found. On the other hand SCHWETZ and GEROKWIZ (p. 777) found the high infection rate of 85.8 per cent. in children at Looza on the river Congo with a spleen rate of 78.9 per cent. In two other areas away from the river and at an altitude of 750-800 metres the rates were considerably lower. Similarly they (p. 778) found very high rates in three other riverside places (where *A. gambiae* was common) but low rates in a district on a plateau where anophelines are rare. These investigations were made in the dry season.

RUSSELL (p. 130) found 55.5 per cent. infections (by examination of a single smear) and 41.5 per cent. spleen rate in infants in Asbanti.

In Dar es Salaam MACKAY (p. 387) reports spleen rates of 88.2 for ages 0-5 and 79.4 for ages 6-10. The infection rate is fairly constant throughout the year and the trend of the graph of parasites per cmm. blood follows closely that of the infection rate of *Anopheles*.

CORRADETTI (p. 677) states that in the Lake Tana region of Abyssinia areas over 2,000 metres above sea level are free from malaria throughout the year but at lower levels malaria occurs during and after the rains.

In the Bahrain Islands of the Persian Gulf AFRIDI and MAJID (p. 678) found malaria to be responsible for nearly one-quarter of the cases treated at the Manama hospital. The spleen rate in children in Manama was 38.9. The average annual rainfall is only 3½ inches but there are copious springs of slightly brackish water.

In part of the Madras Presidency RUSSELL *et al.* (p. 131) found significantly greater spleen and parasite indexes in boys than in girls.

In Laos LEFEBVRE (p. 388) reports that malaria prevails everywhere without intermission and with little seasonal or annual variation. Epidemics are practically unknown but hospital returns indicate that during the rains there is increased prevalence. Spleen and parasite rates in children of 60-80 per cent. have been recorded in some places but the average rates were 59 and 43 per cent. GENEVRAZ *et al.*

(p 131) show that malaria is as hyperendemic in certain restricted parts of the low lying parts of Tonking as in the mountains and that it is with difficulty that Annamese labour can be acclimatized to the conditions. FARINAUD *et al* (p 679) show that the town of Saigon Cholon is an area of extremely low endemicity but there are undoubted foci of malaria and seasonal or sporadic outbreaks occur.

On the coast of British Guiana GIGLIOLI (p 809) reports that epidemic conditions occur in connexion with excessive rainfall which provides breeding facilities and the high atmospheric humidity favourable to *A. darlingi*.

Actiology

KIKUTHI (p 817) states that a stage of development between sporozoites and intracellular forms has been suggested to explain long incubation periods relapses and the inactivity of drugs as causal prophylactics. In inoculation malaria this stage is absent and small doses of drugs serve for cure.

CHRISTOPHERS and SIVTON (p 390) review the nomenclature of the malaria parasites and show how the names *P. vivax* (Grassi and Feletti) *P. malariae* (Grassi and Feletti) and *P. falciparum* (Welch) are justified. MISSIROLI (p 919) on the other hand names the malignant tertian parasite *P. immaculatum* (Grassi and Feletti 1892) with *P. falciparum* as a synonym. ZIEMANN (p 133) differentiates a form of *P. falciparum* which he proposes to name *P. falciparum* subsp. *P. perniciosum*. This has marked virulence and distinctive morphological and biological characters. It has been found in the Cameroons and in Ethiopia. GIOVANNOLA (p 919) also differentiates between the Ethiopian and Roman strains of *P. falciparum* and names the former *P. immaculatum* var. *perniciosum* (Ziemann 1915).

WILSON (p 677) describes morphological differences in *P. falciparum* in the blood of immune and non-immune persons in East Africa. In the former the parasites are polymorphic in the latter almost monomorphic.

In Laos LEFRÈVRE (p 389) finds that splenic enlargement is less pronounced in *P. vivax* than in *P. falciparum* and *P. malariae* carriers.

BOYD and MATTHEWS (p 781) show that the McCoy strain of *P. vivax* has maintained its original antigenic identity for more than 6 years in the course of 40 passages through man and *Anopheles*. CIUCA *et al* (p 390) in a long series of experiments similarly found that the maintenance of a local strain of *P. vivax* in patients in a non-endemic country did not bring about any change in the strain.

ZIEMANN (p 133) discusses *P. ovale* and decides against the species nature of this parasite on the ground that there is no region in which it is found exclusively and that in inoculation experiments reversal to *P. vivax* has been observed. In comment FULTON briefly indicates the strong arguments on which the specific nature of *P. ovale* is based.

SHIEBER (p 809) reports the first discovery of *P. ovale* in Palestine. SCHWETZ (p 808) found *P. ovale* in the blood of several native children in the Congo suffering from afebrile endemic malaria. The presence of schizonts of *P. falciparum* in children was similarly not necessarily associated with illness. BLAIR (p 133) reports eight cases of infection with *P. ovale* in S. Rhodesia, all from a limited area. Both *P. vivax* and *P. malariae* usually uncommon in S. Rhodesia, were found in the same district.

In experimental infection of patients with *P. vivax* and *P. malariae* simultaneously MAYNE and YOUNG (p. 139) show that there is an apparent antagonism of one species against another and they conclude that mixed infections are probably more common in nature than is supposed.

In Freetown SIERRA LEONE, PEASTON and REXNER (p. 926) found a remarkable predominance of *P. malariae*. In the New Hebrides HÉRIVAUX *et al* (p. 918) note that *P. malariae* was not seen during their survey.

P. knowlesi was found by MILAM and KUSCH (p. 140) to have a limited value in induced malaria in man. The course of the infection is generally mild and though relapses may occur it tends to die out spontaneously.

TRANSMISSION

HUTT (p. 8) argues that the life-cycle of malaria involves three kinds of animals—parasite, mosquito and man—all of which are bisexual and therefore probably undergoing genetic change. He has previously shown that susceptibility to the parasite of avian malaria is an inherent characteristic of the individual mosquito transmitted in simple Mendelian fashion. If this is true of Anopheles it might be possible for a mosquito population to change from a low to a high degree of susceptibility or *vice versa*. Immunological differences in strains of *Plasmodia* may similarly be genetic in character. [For the original work on which these speculations are based see this *Bulletin* 1930 Vol. 27 p. 892 1931 Vol. 28 p. 507 1932, Vol. 29 p. 128 703 1934 Vol. 31 p. 464 1936 Vol. 33 p. 237.]

SIXTON AND SHUTE (p. 15) support the view that malaria parasites are harmless to Anopheles if the latter are maintained under favourable conditions, but if the conditions are unfavourable infection tends to shorten life. Their experiments are quoted and they conclude that it is not death from infection which is mainly responsible for the fact that certain species of Anopheles seldom transmit malaria in nature.

WEYER and BOCK (p. 820) point out that for good mosquito infections the number of gametocytes in the blood is important and the increase in the number of human passages affects these adversely. They consider that there is a higher mortality in mosquitoes heavily infected. *A. maculipennis* transmits *P. vivax* better than it does *P. falciparum* and *A. superpictus* is the best transmitter (of those tested) of the latter.

ROY (p. 336) found that in emulsions of salivary glands, when further dilutions were made no proportionate relationship between the numbers of sporozoites and the dilution could be found. He attributes this to the tendency of the sporozoites to adhere to the wall of the glass utensil used and argues that an emulsion leaving a syringe may contain a considerably smaller number of sporozoites than the estimated dose.

WEATHERSLEE and HASSELL (p. 137) describe their method of staining larvae in dilute solution (1/250) of Giemsa's stain for long periods (3 days). Adults emerging from these are unmistakably stained and may remain so for periods up to 39 days.

CAMBOURNAC (p. 820) describes a method for determining the larval anopheline population and its distribution in rice fields in Portugal.

The relationship between salinity and breeding of races of *A. maculipennis* is discussed by several authors. DE BUCK (p. 489) finds in

Holland that *A. maculipennis atroparvus* and *A. m. messeae* are not sharply separated from each other according to the salinity of the water. The latter will lay eggs in brackish water and *atroparvus* in fresh water in which a high larval mortality will occur. From experimental work VAN THIEL (p. 489) concludes that even if water in N. Holland were rendered fresh *A. maculipennis messeae* would not displace *atroparvus*. The coastal distribution of *A. maculipennis atroparvus* in Sweden and Germany is pointed out by EKBLÖM (p. 134) and WEYER (p. 134) but they emphasize that the relation of larva to salinity is not a simple one.

In a discussion on malaria in Holland the Malaria Commission (p. 402) point out that infected Anopheles are only found in late summer and autumn almost exclusively in dwellings but that only *A. maculipennis atroparvus* continues to suck human blood in late summer. Anopheles infection in late summer and autumn is restricted to a comparatively small number of houses which become centres of infection and from these Anopheles spread infection up to the end of October to neighbouring houses up to a radius of not more than 100 metres. About four-fifths of the persons who in a given year suffer from malaria live at most 100 metres distant from a centre of infection which had existed in the previous summer and autumn.

SHUTE and UNGUREANU (p. 810) found that a greater proportion of *A. maculipennis atroparvus* than of other races lives long enough to become infective and that the average *atroparvus* would continue to be infective for a longer time than the average *messeae*.

VAN THIEL *et al.* (p. 1004) show that *A. maculipennis atroparvus* is definitely zoophilic and that the provision of pigsties near the houses in Holland is a valuable protective measure. The races *labranchiae* and *clutus* are definitely anthropophilic, but ROUBAUD (p. 819) shows that although *A. maculipennis labranchiae* is anthropophilic and remains so for three generations when bred in captivity certain individuals in lots bred together may display marked zoophilism which appears to be constant.

SCHILENOVA (p. 490) describes the biological features of *A. maculipennis maculipennis* the principal vector at Sochi on the Black Sea. It is most prevalent in August and 20 per cent. of the engorged females examined contained human blood. *A. plumbeus* is second in importance as a vector. It is strongly zoophilic but attacks man. DANILOVA and BOUDYMKO (p. 491) describe the biology of *A. maculipennis* and *A. hyrcanus* near the sea of Azov. The former is the most important vector. SARIHAN (p. 677) refers to the transmission of malaria in Central Russia during winter and spring by mosquitoes which have been hibernating.

LANGERON (p. 138) reports that *A. claviger* and *A. hispaniola* have been found breeding in grassy pools in the Atlas Mountains at 8,200 feet in regions which are covered with snow for more than half the year. *P. vivax* malaria occurs in epidemic form.

A. pharoensis is the most prevalent Anopheles in Egypt and is a vector. It breeds in rice fields and explains the relationship between rice cultivation and malaria. *A. sergenti* is also probably a vector.

DE MEILLON (p. 135) has found larvae of *A. gambiae* which usually prefers sunlit pools in rainwater stored in total darkness in closed underground cisterns, and in an indoor water barrel in Mozambique. It may thus become a domestic breeder and the author suggests that

the species is kept alive in this way during the dry season until the preferred breeding places are available.

Malaria is only feebly endemic in Coquilhatville on the river Congo and SCHWETZ and BAUMANN (p. 777) failed to find *A. gambiae* (otherwise almost ubiquitous in the Congo) there although other mosquitoes were numerous, including *A. marshalli* var. *moncktoni*.

WILSON (p. 127) has investigated the relationship between length of wing and infectivity in *A. gambiae* in Tanganyika Territory. No significant conclusion was possible but the proportion of long winged individuals increases with a rise in atmospheric humidity and in three localities the higher the infectivity the larger was the proportion of long winged insects. MACKAY (p. 387) shows that in Dar es Salaam *A. funestus* (which flourishes best in the dry season) is as important in transmission as *A. gambiae* (the infection rate of which follows the rainfall curve). *A. gambiae* var. *moles*, which has been found breeding in water with a saline content of 3,267 parts NaCl per 100,000 has not been found infected. WALKER (p. 137) reports that in Freetown, Sierra Leone, all stages of *A. gambiae* and *A. funestus* especially the larvae, are frequently found to be infected with the fungus *Colletomyces africanus* which causes a very high mortality in the larvae.

DR MITCHELL (p. 135) found that *A. coarctatus* var. *leucobromus* will attack man in the absence of cattle and considers that it may play a part in the propagation of winter malaria in S. Africa, when the normal vectors are inactive.

In the Bahrain Islands the only infected species found by ARJIDI and MAJID (p. 678) was *A. stephensi*.

Senior WHITE (p. 14) confirms previous work which indicated that in the Jeypore Hills *A. culicifacies* is of no pathogenic importance and that transmission is due to the *funestus* group *flavistilis* *variosa* and *minimus*. Anopheles control limited to this group has not led to any deterioration in health of the railway staff and has effected a 78 per cent saving in expenditure on larvicides. *A. culicifacies* is similarly unimportant in the Singbhum Hills (p. 14). Pigsties offer no attraction to the Anopheles of the Jeypore Hills. In the Tanjore District of the Madras Presidency RUSSELL *et al.* (p. 131) show that *A. culicifacies* is the only efficient vector but is not an energetic one. It breeds in irrigation water.

ROY *et al.* (p. 681) call attention to the fact that *A. stephensi* is abundant in Calcutta and that, though a dangerous vector in other cities of India, it is not a carrier in Calcutta.

RUSSELL *et al.* (p. 1005) report the simultaneous natural infection of *A. subpictus* and *A. rufus* in Madras.

ITYENGAR (p. 1005) shows that in the plains of Bengal *A. philippinensis* and in the foothills *A. minimus* are the most important vectors. GRAYSON *et al.* (p. 132) point out that in the lower hilly country of Tonking *A. minimus* is most prevalent in the dry season and found its rate of infection to be 6-15 per cent—a rate higher than that found in many parts of the mountainous region. *A. jeyporensis*, *A. maculatus* and *A. rufus* are also dry season mosquitoes. Infection of *A. aconitus* was found but its zoophilic tendencies explain its unimportance as a vector. LEFEBVRE (p. 389) in Laos also notes that owing to the adaptability of its larval form *A. minimus* persists throughout the year. In certain places and at certain seasons *A. maculatus*, *A. jeyporensis* and *A. leucosphyrus* are effective vectors.

KINGSBURY (p 129) shows that in Malaya both *A. barbirostris* and *A. sundanicus* appear to have a marked preference for human blood. CNEDECAL (p 779) shows how in Hanoi *A. vagus* and *A. hyrcanus* var *sincensis* are strongly attracted to horses and that this fact is useful in prophylaxis in the cavalry troops stationed there. In Saigon malaria is not common and FARINAUD *et al* (p 679) put forward the hypothesis that the enormous proliferation of *A. vagus* as an effectual vector is responsible for the little transmission that does occur. No important vector is present in any considerable numbers.

In Tonking TOUMANOFF (p 391) shows that *A. hyrcanus* var *sincensis* does not actually hibernate but that the interval between feeding and egg laying becomes extended up to over 100 days in winter. He (p 810) shows that the evolution of malaria parasites in the vectors of Indo-China is sometimes slower than is generally thought even at optimum temperatures.

In the New Hebrides HÉRIVAUX *et al* (p 918) found only *A. punctulatus* which breeds in very diverse waters but principally in relation to the rainy season.

A higher proportion of lots of *A. quadrimaculatus* was found by BOYD and KITCHEN (p 492) to become infected to a rate of over 75 per cent when fed on patients infected with *P. vivax* if exflagellation could be demonstrated than if it could not. Such a difference was not noted with *P. falciparum*.

GIGLIOLI (p 809) concludes from his investigations that *A. darlingi* is the only important vector on the coast land of British Guiana. It is anthropophilic unlike *A. tarsimaculatus* and *A. albitalis*. Its breeding preferences are described.

In Ternuco which is highly malarious *A. pseudopunctipennis* is the sole vector. VARGAS (p 779) found that 33 per cent. preferred man to cow and 27 per cent. preferred man to horse.

PINTO (p 680) reports that *A. gambiae* in Brazil is spreading and breeding in many types of water. Sporozoite rates of 90 per cent have been found.

Immunity and Pathology

PARROT and CATANEI (p 388) investigated the immune state of a highly infected population in Algeria. Premunition is established about the 10th year. It is less complete, less early and more ephemeral in *P. falciparum* than in *P. vivax* and *P. malariae* infections and violent *P. falciparum* epidemics occur from time to time as the immunity wanes and if excessive breeding of *Anopheles* takes place. Gametocyte carriers in *P. falciparum* infections are 5 per cent. of the infected but *P. vivax* carriers are 42.8 per cent. and *P. malariae* carriers 63.6 per cent. Old cases of the two latter are important reservoirs and epidemics occur but rarely.

WILSON (p 676) in Tanganyika Territory compares the natural history of *P. falciparum* malaria in a continuously hyperendemic area with that in a district in which, though infection is heavy, it is more seasonal. In the former the high spleen rates, parasite rates and parasite counts in childhood fall considerably to adult life and there are no apparent ill effects due to malaria from late childhood onwards. Full immunity is acquired. In the latter the spleen rates and parasite rates decline but slightly with age and attacks of malaria occur in adults during the transmission season. Immunity is incomplete.

because transmission is seasonal. He agrees that immunity to *P. falciparum* is very evanescent. He points out (p 128) that the presence of a few parasites in the blood of a non immune person means that he is suffering from malaria, but this is not so in an immune person. An immune person may suffer from heavy infection if he removes to another district but its significance is not the same as that of a similar infection in a non-immune. CIUCA *et al* (p 390) conclude from studies on induced malaria, that individuals are more susceptible to imported than to local strains of *P. vivax* and that those who have been infected with a local strain have a relative immunity towards an imported strain. These conclusions agree with those of WILSON concerning immunity to *P. falciparum*.

In a community in which the spleen and parasite rates diminish with age, SICAULT and MESSERLIN (p 781) found the melano-flocculation serological index to increase. Of the inhabitants in an endemic area in relatively good health 44 per cent. showed neither enlarged spleens, parasites nor positive serological reactions, yet these persons were not more prone to malaria than the rest. The authors conclude therefore that besides premunition a true immunity not dependent upon the existence of parasites may be developed. DECOURT (p 782) in a discussion of these views, considers that Henry's reaction may persist after the eradication of parasites. In addition to specific immunity he postulates a non-specific immunity connected with endothelial irritation by destruction products of parasites and red cells especially melanin, and not dependent upon the presence of the parasite. The term immunisation is employed to describe immunity following natural infection, and serological reactions afford evidence of this.

CROCHETTO (p. 678) found enlargement of the spleen to be most common in *P. vivax* infections in Somaliland. Very large spleens are rare in *P. falciparum* infections [but see LEEVER above]. GIULIOLI (p 809) notes that splenic enlargement is much more marked and persistent among East Indians in British Guiana than among negroes living under exactly similar conditions.

Evidence of the long duration of immunity to homologous reinfection with *P. vivax* is quoted by BOYD and MATTHEWS (p 780). Two patients were infected 7 years after primary infection, and though no evidence of persistence of the original infection could be found, the only evidence of reinfection was the appearance of a few parasites in the blood and (in one only) a single clinical attack.

BOYD *et al* (p. 493) quote experimental work which indicates that simultaneous infection with two strains of *P. vivax* delays the development of homologous immunity to either. BOYD and KITCHEN (p 922) have demonstrated experimentally the absence of cross immunity between *P. vivax* and *P. falciparum* infections.

KITCHEN (p 138) found, in two cases of *P. vivax* infection, that the percentage of reticulocytes infected was much greater than that of adult red cells, that multiple infections were more numerous in the reticulocytes, and that in the later stages of the disease there was a marked increase in the number of reticulocytes. HENEGAR (p 138) however does not consider that the red cells are susceptible to infection only during the reticulocyte stage as has been claimed. He points out that infection "takes place largely in restricted areas of the viscera or in the peripheral blood" and that the percentages of infected reticulocytes and mature red cells are "reliable criteria of the conditions in which infection occurs. Malaria infection of red cells

only occurs with certain strains of *P. vivax* and Hingst considers that amitotic division is responsible.

HEGNER (p 495) from his own work, accepts the view that *P. vivax* has a special affinity for reticulocytes and in similar preparations finds that *P. falciparum* (and *P. knowlesi*) prefer to attack mature red cells. He concludes that the malignancy of these two parasites may be due to this property as well as to the rapidity of multiplication. *P. malariae* also shows a predilection for mature cells but its slow rate of multiplication renders it less malignant. Similarly KITCHEN (p 811) found that the total numbers of mature cells infected with *P. falciparum* constantly exceeded the total numbers of reticulocytes so infected but there were variations in the percentages infected. In *P. malariae* infection reticulocytes were only rarely attacked.

JOLLY and DANGLEMONT (p 782) consider that lack of resistance to *P. falciparum* allows extremely rapid multiplication with important destruction of parasites and red cells. Débris is so abundant that the phagocytes are unable to deal with it and this plays a part in determining pernicious attacks by mobilizing macrophages which contribute to capillary embolism and by blocking the kidneys with resulting uraemic symptoms.

GARNHAM (p 492) examined the placentas of 500 native women in Kenya. Very large numbers of parasites may be found in the maternal blood spaces and a reticulo-endothelial response with phagocytosis of parasites is stimulated. He thinks that the origin of the macrophages may be the lymphocytes of the blood stream as is the case with lymphocytes in the spleen. It is possible that relapses which follow parturition are due to the sudden removal with the placenta of a highly active reticulo-endothelial system. He was unable to demonstrate the passage of parasites from mother to foetus [see also SCHWETZ below]. On the other hand, infected red cells in the umbilical cord and elsewhere in the foetus were found by GARCIA (p 138) in post mortem examinations of two pregnant women who died of cerebral malaria in the Philippines [see also below *Clinical*].

In a search of local tissue and lymphatic glands after mosquito infection BOYD and KITCHEN (p 811) found one extra vascular sporozoite and others in the connective tissue (not the lymphoid tissue) of the glands. This does not suggest that they travel usually by the lymph channels.

Clinical

BOYD and KITCHEN (p 682) infer that if mosquitoes are applied to several subjects consecutively the number of sporozoites in their glands will gradually diminish. When 1-5 mosquitoes are used there are significant differences in the character of the infection experienced by the first and last patient of a series the latter having longer incubation periods and shorter attacks. The duration of the attack following inoculation by a moderate number of mosquitoes tends to vary inversely with the duration of the incubation period and attacks of less than 8 days duration may be as significant of inadequate inoculation as of immunity. Similarly SACK (p 139) reporting a case of *P. vivax* malaria in which the incubation period was between 11 and 12 months inclines to the view that this may have been due to infection with a small number of parasites. SIOLI *et al* (p 494) on the other hand in describing the characters of infection with the Madagascar strain of *P. vivax* note that there was no relation

incidence in troops in Palestine and Egypt. JAMES considers that anti-larval methods have limited scope in war time and advises insecticidal sprays and prophylactic quinine. CASTELLANI (p. 175) attributes the relative freedom of the Italian troops in the Ethiopian campaign to rigidly enforced quinine prophylaxis of 0.6 gm. daily. Periodic urine tests were made to determine whether or not the quinine had been taken.

PIZZILLO (p. 176) considers that splenometric measurements should be related to anthropometric measurements to provide comparable indexes between individuals.

ZOTTA (p. 176) shows that in Rumania *A. maculipennis* is the only important vector. *P. vivax* is the commonest infection, *P. falciparum* only accounting for one-quarter of the cases. In many provinces endemicity is high. CROOK (p. 177) reports on malaria in Szechwan.

STRICKLAND *et al.* (p. 177) record the average interval between birth and the first attack of malaria in infants born in an endemic area in Bengal, according to season.

EARLE *et al.* (p. 178) made a very complete series of observations on 76 negro children in Porto Rico involving asexual and sexual parasite counts in over 10 000 films and clinical examinations. *P. falciparum* is the commonest infection, but all three plasmodia occur and mixed infections are frequent. 41 of the 76 showed all three parasites at one time or another. They believe that the onset of a new infection can be determined and that each infection probably runs a definite course to natural cure. The highest parasite counts and the largest spleens were found within very few weeks after the onset of the first observed infection.

FAUST (p. 178) in a discussion of malaria in relation to life insurance policies states that in the southern U.S.A. the average annual incidence is about 4 per cent. of the population.

SERGEANT *et al.* (p. 179) agree that the name *P. falciparum* should be adopted to designate the parasite of subtertian malaria.

KITCHEN (p. 179) finds that *P. falciparum* shows a lack of consistency in its tendency to be associated with erythrocytes of a given age group and that *P. malariae* is found most frequently in mature erythrocytes.

BATES (p. 179) records differences in the tolerance of various salts between larvae of six races of *A. maculipennis* and *A. superpictus*. MAROTTA and SANDICHI (p. 180) describe infection of *A. maculipennis* var. *mesasiatica* with *P. malariae*. VINOGRADSKAYA and TIMROT (p. 180) show that *A. superpictus* bred in the laboratory differ considerably from those observed in the field in behaviour and physiological condition.

HU (p. 181) describes observations on the time of exit of *A. hyrcanus* var. *sincensis* from houses in Shanghai.

FROME (p. 181) concludes tentatively that *A. quadrimaculatus* and *A. parvipennis* generally occur in waters poor in Desmids and *A. walkeri* in water rich in Desmids. BUXTON in comment points out the unsuitability of Desmids as indicator plants.

WILSON (p. 182) describes the differences in the immune state of East African tribes which are subject to continuous or to seasonal infection, conditions which depend on the continuous or seasonal breeding facilities for *A. gambiae*. In the former treatment of children only is necessary; in the latter it is required at all ages, but control of anopheline breeding may be practicable.

SYTON *et al* (p 183) show that *P. ovale* infection confers marked resistance to reinoculation with both homologous and heterologous strains and that against the latter resistance is more effective than is the case with either *P. vivax* or *P. falciparum*.

From investigations in Greece MANDELOS (p 183) concludes that the general mortality in children harbouring parasites is no higher than in others probably because the former receive more medical attention than the latter and that infant mortality in malarious regions is not much influenced by economic status.

DAS GUPTA (p 184) in discussing congenital malaria believes that the placental barrier is injured by chronic rather than by acute infection and that this may be the reason why in monkeys *P. knowlesi* is never found in the foetus.

GHIZZETTI (p 184) describes a patient with signs of advanced pernicious anaemia and malaria cure of both was effected with atabrin and plasmoquine. JAMES (p 185) reports 22 cases of malarial nephritis in the Solomon Islands and New Guinea.

SANDERS and DAWSON (p 185) report on the results of the five day treatment of malaria with 20 grains of quinine daily.

FARINAUD and ELICHE (p 185) find that septasine is remarkably effective against malarial schizonts and against sexual forms of *P. vivax* but has no action on gametocytes of *P. falciparum* similarly CROPPA *et al* (p 186) find that prontosil has a mild action in malaria but not against gametocytes of *P. falciparum*.

To terminate therapeutic malaria CLEVELAND and TURVEY (p 186) advocate a full course of mapharsen.

TOUMANOFF and HOANG TICH TRY (p 187) observed in Hanoi that the infection rate of *A. minimus* was about the same whether the gametocyte rate was 10 or 40 per cent. Malaria prophylaxis cannot therefore in such places successfully be limited to medical measures.

AZIZ (p 187) uses a suspension of Paris green in water for spraying in place of dusting. It is quite as efficient and is more economical and less dangerous to the personnel.

SERGEANT (p 187) has devised a method for preventing female *Gambusia* from eating their own young.

Bird and Monkey Malaria—HICOTH and MUDROW (p 188) believe that only sporozoites or merozoites of exoerythrocytic schizonts (E forms) of *P. calhemerrum* and *P. relatum* give rise to exoerythrocytic schizonts and to pigmented parasites in the red cells. merozoites of the latter give rise only to other red cell forms. Quinine atabrin and certuna were active against pigmented red cell forms but not against E. forms but plasmoquine was active against E. forms as well.

BOYD and DUNN (p 189) show in birds that quinine and plasmoquine act by reducing the rate of reproduction of *P. calhemerrum* rather than by increasing normal destruction. This affords an explanation of why quinine fails to eradicate infection but reduces it to a low level.

CHRISTOPHERS and FULTON (p 190) describe a technique involving the use of saponin for obtaining parasites of *P. knowlesi* in a viable condition and entirely free from red cells.

SOMOGYI (p 190) shows that serum from monkeys with chronic *P. knowlesi* infection will agglutinate infected red cells from other monkeys if 5-10 per cent of these cells contain mature parasites.

SINGH and SINGH (p 190) show that M & B 683 will cure *P. knowlesi* infection in monkeys.

CHRISTOPHERS (S. Rickard). *Malaria in War*—*Trans. Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33 No. 3 pp. 277-292. With 3 maps & 1 fig. Discussion pp. 292-304 [WEXYON (C. M.) PERRY (H. Marrian) MANTFOLD (J. A.) JAMES (S. P.) MANSON BAHR (P.) WILLCOX (William) & WHITTINGHAM (H. E.)].

The choice of subject for this presidential address was prompted by current events. Its main theme concerns the measures that are necessary to safeguard the efficiency and welfare of troops should they be called upon to operate in regions in which malaria is endemic.

Though the aetiological fundamentals of "war malaria" differ in no essentials from those of malaria in a civil community at peace the term is justified. Malaria in the past has influenced the results of wars; the epidemiology of malaria in armies in the field may have special characteristics; and the prevention and treatment of malaria in such conditions have special features.

The author refers to the incidence of malaria in past campaigns since the Napoleonic Wars but it is only from experience gained in certain campaigns of the Great War that information of much utility is forthcoming. Special reference is made to malaria in Taranto during the war as it affected British troops, to malaria in the Macedonian region, in the Mesopotamian campaign, in the East African campaign, and during the operations in Palestine. No mention is made of the malaria experience of allied or enemy forces.

Based on war experience the author discusses the various anti-malaria measures that were applied and their relative value. The discussion leads to the elaboration of the central idea of the address which is the necessity of planning ahead. A malaria laboratory would certainly be required to ascertain the conditions and to decide on and to supervise the measures to be taken; this should be planned beforehand. The necessity of carrying out antilarval measures will almost certainly arise. Paris green may be required on an enormous scale; arrangements for this must be made in advance. Experience of quinine prophylaxis in the Great War was not encouraging but the author states that "we dare not neglect quinine prophylaxis." For this, too, plans must be made in advance. The supply of atabrin or atabrin substitutes must be arranged for. No reference is made to the probable extensive use of synthetic drug prophylaxis in future wars. Mosquito-proofed huts may be asked for and mosquito nets may have to be supplied. There must be hospital organization for the examination of blood films necessitating the provision of microscopes, stains, slides and trained technicians; this demands forethought.

If there is a probability that large bodies of troops may be employed in malarious areas an effective advisory organization for malaria should be constituted and its working established well ahead.

DISCUSSION.—WEXYON (C. M.) pointed out that since the last war much has been done by the Army Medical Services to apply modern knowledge to the prevention of malaria, notably in India and Palestine. In war the nature of anti-malaria measures is dependent upon the character of the expedition. Since the last war the introduction of Paris green as a larvicide has been an important innovation. Quinine prophylaxis does not prevent infection but it does prevent attacks of malaria.

PERRY (H. Marrian) described the existing army organization for laboratory diagnosis of malaria infection. In a malarious country the

base would have a fully equipped laboratory. There would be a mobile bacteriological laboratory for a group of casualty clearing station, and each of these stations would have a clinical side room equipped for malaria diagnosis. Malaria diagnostic panniers for advanced medical units have proved their worth in the North West Frontier of India and in Palestine. Training of personnel in malaria diagnosis has received adequate attention and the training of laboratory technicians has not been overlooked. Atebrin will shortly be manufactured in this country and the home manufacture of plasmoquine is receiving attention. There would be no difficulty with regard to the supply of microscopic stains.

MANITOLD (J. A.) said that the Army Medical Service had had much experience of malaria since the last war—it was not now necessary to think in terms of 1914–15. The Palestine army malaria rate was 13 per thousand in 1938—this year up to date it was 5.6 per thousand. Corresponding rates for troops in Egypt were 14 and 3.8. He described the mosquito nets now being used by troops in India and Palestine and referred to drug prophylaxis. Lately atebrin 0.2 gm twice a week had been used in place of quinine. Culicifuges were of value. Anti mosquito cream used in the army contains oil of citronella, camphor and cedar wood oil—applied to exposed parts of the skin it repels mosquitoes and sandflies for six hours. With regard to synthetic remedies French preparations were available.

JAMES (S. P.) stressed the importance of information available in the reports of the Malaria Commission of the Health Organisation of the League of Nations with regard to the distribution and epidemiology of malaria in Europe and anti malaria measures. He was of the opinion that the scope for anti larval measures was very limited in war time. He advocated concentration of effort on direct measures applicable to the individual soldier and to the barracks hut or tent in which he lived. The daily use of insecticidal sprays was of value. Five grains of quinine a day will prevent clinical attacks of malaria. It may be a difficult problem to ensure that every soldier takes his quinine but it was a problem that was solved by the brothers Sergeant for the French army in Macedonia.

MANSON BAHR (P.) spoke of war experience in Palestine and of the value of the work of the diagnostic stations during that campaign.

WILLCOX (W.) referred to the manner in which influenza in the latter half of 1918 activated latent malaria infections in Northern Persia.

WHITTINGHAM (H. E.) thought that the Royal Society of Tropical Medicine and Hygiene might do more than it has done to instruct the public health worker in the elements of tropical hygiene by organizing demonstrations at Congresses by cinema films and the like. In a big war the army has to enlist the services of many who are untrained in tropical hygiene. He referred to the conservancy of microscopic stains in the field. A saturated solution of Leishman's stain in methylated spirit keeps in an air tight staining pot for many months, though used daily for many films. Unfixed films are left in the pot for five minutes washed quickly with distilled water and then dried.

Norman White

CASTELLANI (Aldo) *Malaria and War* [Correspondence]—*Lancet* 1939 Nov 11 pp 1048–1049

In the Ethiopian Campaign the Italian forces suffered very little from malaria though operating in intensely malarious country. The

total force numbered 500 000. Throughout the war there were but 1,241 hospital admissions for primary malaria and 1 093 for relapses. The author attributes this relative freedom from clinical malaria to the administration of prophylactic quinine, which was rigidly enforced: each man received 0.6 gm. 3 tablets of quinine bishydrochloride, or sulphate, each day. Periodic urine examinations were used to determine whether the quinine had been taken: a few drops of Tanret's reagent causes the urine to become turbid if quinine has been taken.

N IV

SARGENT (Edmond) L'oeuvre de la commission du paludisme de la Société des Nations depuis 1930. [The Work of the Malaria Commission of the League of Nations since 1930.]—pp. 25-47. [12 refs.]

PIZZILLO (Giuseppe) Splenometria e tipi costituzionali. [Splenometry and Constitutional Types.]—*Riv di Malarologia*, Sez. I 1939 Vol. 18, No. 2 pp. 131-137. With 3 figs. German summary (6 lines).

The author describes the various methods in use for measuring the enlargement of the spleen. He then proceeds to show that these methods give results that are not comparable *inter se* unless account be taken of the constitutional types of the individuals concerned based on anthropometric measurements. Various types of thorax and abdomen are figured and described.

N IV

ZOTTA (G) Contribution à l'étude de la distribution des races d'*Anopheles maculipennis* en rapport avec les grandes lignes de répartition du paludisme en Roumanie. [Distribution of Races of *A. maculipennis* in Relation to Distribution of Malaria in Rumania.]—*Arch Roumaines Path Expér et Microbiol.* 1939 June. Vol. 11 No. 2 pp. 209-246. With 5 graphs & 2 maps.

This well documented report starts with a description of the outstanding geographical features of Rumania with special reference to the influence that these have on the distribution of anophelines and the prevalence of malaria. Four species of *Anopheles* have been found in Rumania, *A. maculipennis*, *A. bifurcatus*, *A. plumbeus* and *A. pseudopictus*. *A. plumbeus* plays no rôle as a vector of malaria: it is found for the most part in forests and is most plentiful in the sub-Carpathian hills. *A. bifurcatus* is more widely distributed: it is a wild mosquito not often found near human habitations though it will attack man even in daylight. It has not been incriminated as a spontaneous vector of malaria. *A. pseudopictus* likewise plays no rôle in the spread of malaria: it is especially plentiful in the Danube delta and elsewhere where saline breeding places are available for its propagation. *A. maculipennis* is the only important transmitter of infection in Rumania: four races of this species are found, *typicus*, *massicus*, *atroperous* and *clavus*. *A. m. melanocoon* has not been found, neither has *labranchius*. *A. m. typicus* is found in all hilly regions and in the valleys of rivers down to their outflow into the Danube. *A. m. massicus* abounds throughout the low-lying parts of the country which are subject to flooding by rivers: except for hilly country it can be found throughout the country. *A. m. clavus* is confined to the littoral of the Black Sea. *A. m. atroperous* is found on the coast and as far inland as 700 kilometres wherever saline breeding places are available: these are numerous.

The relative frequency of the three species of *Plasmodia* is *vivax* 72.15 *falciparum* 26.30 and *malariae* 1.55 per cent. These proportions hold good for practically the whole country. Malaria is very wide spread the maximum annual number of cases according to official statistics is 400 000. This is said to be a gross understatement. In many provinces endemicity is very high. The author distinguishes the malaria of the regions liable to flooding by the Danube malaria associated with other large rivers malaria of other internal districts and the *elutus* malaria of the coast which are determined by more or less divergent and characteristic conditions of anophelism. N IV

CROOK (R. L.) Some Notes on Malaria in Szechwan.—*Chinese Med J* 1939 May Vol. 55 No 5 pp 465-478 With 1 map & 2 charts. [13 refs.]

This note on the prevalence of malaria in Szechwan Province is based for the most part on the replies to a questionnaire supplied by 13 hospitals. In five localities school-children were examined for splenic enlargement and in the Yachow District a small number of children were examined for parasites.

Malaria is endemic throughout the Province hyperendemic in a few localities. There has been no epidemic of malaria in recent years. For the years 1934-1937 the percentage of in patients suffering from malaria was 4.19 and of out patients 1.39. Reports from 10 hospitals regarding the species of parasite showed that 52.5 per cent were tertian 41 per cent subtertian and 6.5 per cent quartan.

Five species of *Anopheles* have been found *A. hyrcanus* var *sinensis* *A. Pattoni* *A. minimus* *A. lindsayi* var *plectan* and *A. gigas* var *baileyi*. The first three are probable vectors *A. minimus* being the most important. No mosquito dissections have yet been carried out.

N IV

STRICKLAND (C.) SEN GUPTA (S. C.) & MAZUMDAR (P. C.) Further Observations on the Seasonal Insectivity of Mosquitoes as determined by a Study of the Incidence of Infantile Malaria.—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol 33 No 1 pp 69-74

On a tea estate in the North Bengal Duars all children born during a period of four years were kept under observation and records were kept of the age of infants under one year at the time they first developed malaria. Infection by the mosquito may occur in any month of the year. The average interval between birth and the first attack of malaria was 120 days for those born in the cold season 106 days for those born in the hot season and 103 days for those born in the rainy season.

N IV

CHIN (Y. T.) Notes on Malaria in Certain Parts of Manchuria.—*Jl Oriental Med* 1939 May Vol. 30 No 5 pp 221-224 With 1 map

This paper adds very little to our knowledge of malaria in North Manchuria. In Koshan Peian and Tehtu 133 *A. hyrcanus* var *sinensis* and 3 *A. maculipennis* were captured and dissected. none

was infected. Local conditions and native customs did not permit blood or spleen examinations—the information about malaria is based on present symptoms and histories of past attacks. N II

EARLE (W. C.) PÉREZ (Manuel) DEL RÍO (Juan) & ARZOLA (Carmen). Observations on the Course of Naturally Acquired Malaria in Puerto Rico.—*Puerto Rico Jl Public Health & Trop Med* 1939 June Vol 14 No. 4 pp 391–408. With 1 chart. [Spanish version pp 407–421]

The observations recorded were carried out in an isolated village the inhabitants of which usually suffered their malaria without specific treatment. The parasite and spleen rates in the region varied between 30 and 40 per cent. Weekly observations were made from May 1931 and August 1934. A total of 78 negro children, between the ages of 5 and 15 were kept under observation—they rarely if ever received an antimalarial drug. At each visit the species of plasmodia was determined and sexual and asexual parasite counts were made, the spleen was measured, the oral temperature was taken and notes were made regarding any subjective symptoms of the child. In all, 10,228 blood smears were examined, of which 5,140 contained parasites, the percentage of species being *P. falciparum* 56.63, *P. vivax* 27.33, *P. malariae* 6.48, *P. vivax* and *falciparum* 8.92, *P. vivax* and *malariae* 0.33, *P. falciparum* and *malariae* 0.23 and all three species 0.08. Of the 78 individuals 41 showed all three parasites at one time or another, 29 showed *P. falciparum* and *P. vivax* on different occasions, 5 showed *P. falciparum* alone and 1 had a mixed *P. falciparum* and *malariae* infection. The maximum parasite counts per cmm. of blood were *P. falciparum* 208,103, *P. vivax* 46,215, *P. malariae* 8,458. The maximum gametocyte counts were *P. falciparum* 18,378, *P. vivax* 500, *P. malariae* 1,081. There was marked variation in the distribution of parasites. *P. falciparum* was found most frequently, to the exclusion of other parasites. Often *P. vivax* infections were replaced rapidly by *P. falciparum*, *P. vivax* only reappearing when *P. falciparum* infection had reached a very low level. Gametocytes of two species were sometimes observed in a single smear but high counts of both were rarely observed. The incidence of *P. falciparum* parasites in smears was highest immediately following rises in mosquito density. The incidence of *P. malariae* gametocytes was highest just after the incidence of *P. falciparum* gametocytes had reached its lowest point.

The authors believe that the onset of a new infection can be determined and that each infection probably ran a definite course to a natural cure. Fever was most common in *P. falciparum* infections at the time of or within ten weeks after the sharp rise in parasite counts indicative of new infections. Highest parasite counts and largest spleens were found within very few weeks after the onset of the first observed infections. The highest proportion with gametocytes was found in the first week of *P. vivax* infections, in the third week of *P. falciparum* infections. N II

FALST (Ernest Carroll). What the Life Insurance Companies think of Malaria.—*Southern Med Jl* 1939 July Vol 32 No 7 pp 699–683.

The information contained in this paper is based on replies to a questionnaire received from twenty representative Insurance Companies.

doing business in the Southern States. It appears that in the group of standard insurance risks malaria does not constitute a particular hazard. Some companies do not employ safeguards, others refuse to write standard policies for certain areas in the South, some demand an extra premium for residence in malarious areas or from persons with a history of malaria. The population which suffers most from malaria belongs to a poor economic group not usually applying for standard policies. The author estimates that the average annual number of malaria cases in the South is at least a million and a half or about 4 per cent. of the population. N II

SERGEANT (Ed.) SERGEANT (Et) PARROT (L.) & CATANEI (A.)
Nomenclature of the Malarial Parasites. [Correspondence]—
Brit Med J 1939 Apr 8. pp 747-748

The authors refer to the recommendation made by CHRISTOPHERS & SINTON that *Plasmodium falciparum* should be universally adopted to designate the parasite of malignant tertian malaria [see this *Bulletin* 1939 Vol. 36 p 390]. In the past they have used the designation *Plasmodium praecox* Grassi and Feletti 1890 which is the *de jure* nomenclature. They agree however that a strict application of the rules of nomenclature would lead to much confusion and that the three common specific names for the parasites of the common malaria fevers *vivax malariae* and *falciparum* should be universally adopted. They further consider it desirable that the specific name *praecox* should be abandoned as the designation of the first avian plasmodium described by Grassi and Feletti. It should be called *Plasmodium relictum* Grassi and Feletti 1891. The specific name *praecox* for a plasmodium is therefore a *nomen nudum*. N IV

KITCHEN (S F) The Differential Infection of Mature and Immature Erythrocytes by the Plasmodia of Human Malaria.—*Southern Med J* 1939 July, Vol. 32. No 7 pp 679-685 [14 refs.]

The author has previously shown that *P. vivax* has a much greater tendency to occur in reticulocytes than in mature erythrocytes [see this *Bulletin* 1939 Vol. 36 p 138]. In this paper similar observations are also described on three *P. falciparum* infections on one from the 14th to the 42nd day of the disease on a second during the first three weeks and the sixth and part of the seventh week and on the third from the 3rd to the 16th day of the disease. Two quartan cases were also observed.

P. falciparum shows a lack of consistency in its tendency to be associated with erythrocytes of a given age group. *P. malariae* is found most frequently in mature or older erythrocytes. The results suggest the existence of fundamental differences among the plasmodia in regard to the mechanism of invasion of new host cells by the merozoites. These differences may have a bearing on the densities of the different plasmodia and on the associated anaemia and specific immunity. N IV

BATES (Marston) The Use of Salt Solutions for the Demonstration of Physiological Differences between the Larvae of Certain European Anophelline Mosquitoes.—*Amer J Trop Med* 1939 July Vol. 19 No 4 pp 357-384 With 4 figs [12 refs.]

The object of this work was to devise standard laboratory methods by means of which the mineral requirements of different species or

local races of Anopheline larvae can be utilized for the purpose of recognising these entries in the same way as morphological characters are ordinarily employed. Experiments were made with six forms of the *Anopheles maculipennis* complex and with *A. superpictus*. The larvae were kept for 3 days at 27°C. in solutions of sodium chloride potassium chloride magnesium sulphate and calcium sulphate and the percentage of larvae surviving recorded. Larvae of *sackayensis* differ markedly from all others in their greater tolerance of sodium chloride *atroparensis* larvae from many parts of Europe have less need for calcium than any of the other forms and in the presence of calcium they are relatively tolerant of sodium chloride *labranchiae* is identical with *atroparensis* in its tolerance for sodium chloride but has much greater calcium requirements *subalpinus typicus* and *messasi* are far less resistant to sodium chloride *A. superpictus* larvae differ from all the others in their inability to survive in media in which there is not a readily available supply of calcium

J. B. Wigglesworth

MAROTTA (G.) & SANDICCHI (G.) Contributo all'infezione sperimentale di anofeli con *Plasmodium malariae* e inoculazione della malattia all'uomo. [Experimental Infection of Anophelines with *Plasmodium malariae* and Transmission of the Disease to Man.]—*Riv. di Malarologia*. Ser. I 1939 Vol. 18 No. 2 pp. 80-84 With 4 charts. English summary (5 lines)

This paper describes the infection of laboratory bred *A. maculipennis* var. *messasi* with *Plasmodium malariae*. Sporozoites were found in the salivary glands 24 days after the infecting meal. Infection was transmitted to two patients needing malaria therapy. The incubation periods in these two patients were 23 and 29 days, respectively

A. W.

VINOGRADSKAYA (O. N.) & TIMROT (S. D.) Culture de l'*A. superpictus* Grassi au laboratoire. [Breeding of *A. superpictus* in the Laboratory.]—*Mé. Parasit. & Parasitic Dis.* Moscow 1938. Vol. 7 No. 6 pp. 840-841 [In Russian.] [Summarized in *Rev. Applied Entom.* Ser. B 1939 Sept. Vol. 27 Pt. 9 p. 184]

Details are given of the breeding in the laboratory in Moscow of *Anopheles superpictus* Grassi, from females taken in Stalimabad (Tadzhikistan) in October 1937. Till about the end of November the adults and larvae were kept at a temperature of 28-27°C. [78-8-80-6°F] and from then onwards at 29-31°C. [84-2-87-8°F] and a relative humidity of 40-50 per cent. It was found that in the laboratory the behaviour and physiological condition of the mosquitoes considerably differed from those observed in the field. In all generations, of which 5 were produced up to about the end of May of the following year the females took blood several times before ovipositing, whereas in nature, as a rule one blood meal is sufficient for the maturation of eggs. The majority of the initial females were in a state of gonotrophic dissociation although they repeatedly fed on blood, their ovaries did not develop and most of them produced fat-body. A few however oviposited and the resulting adults emerged between 9th and 27th November. Practically all the females of this generation also produced fat-body only in spite of repeated feeding. Only 2 of them

oviposited in the second half of December. The adults of the second laboratory generation emerged between 6th and 14th January and the first batch of eggs was deposited on 28th January.

HU (Stephen M. K.) The House-Frequenting Behavior of *Anopheles hyrcanus* var *sinensis* Wiedemann in the Shanghai Area, Part 2—Time of Exit.—*Lingnan Sci J* 1939 May 13 Vol 18 No 2. pp 133-142. With 5 charts & 2 figs on 1 plate.

Observations on the time of day at which *A. hyrcanus* var *sinensis* enters houses were recorded in a previous paper [see this *Bulletin* 1936 Vol. 33 p 255]. The observations in this paper concern the time of exit. A cow stable attached to a farm was selected. A tent of mosquito net was erected over the door during the observations. The door was the only means of ingress or egress for mosquitoes except for a slit three feet long and two inches wide just under the eaves on one side of the stable. During 5 consecutive days mosquitoes attempting to fly out and caught in the net were collected and counted every two hours. Anophelines began to leave the stable at dusk and continued to leave during the dark hours. The number leaving was greatest during the two hours immediately after sunset. Nearly all that were in the stable at sunrise stayed in the stable throughout the day. N II

FROHNE (W. C.) Anopheline Breeding. Suggested Classification of Ponds based on Characteristic Desmids.—*Public Health Rep* 1939 July 28 Vol. 54 No 30 pp 1363-1387 [10 refs.]

The author has devised a way of classifying ponds etc. by their flora, particularly by the Desmids, a group of microscopic algae. He relates his conclusions to the distribution of larvae of several species of Anopheles.

All field workers would agree with the author that it is most difficult to classify fresh waters and that such words as pond, seepage or borrow-pit are indefinite and unsatisfactory. Biologists have frequently looked for indicator species by which one means plants or animals which might readily be identified and which could be made the basis of a biological classification. The author of the present paper has studied twenty-six ponds in South Carolina and Georgia and given detailed attention to the Desmids inhabiting them. The ponds vary greatly in size, exposure to the sun etc. moreover the water in some was derived from artesian wells in others from seepages or surface drainage. The paper presents a large body of fact on which the waters are divided into those poor and those rich in Desmids and then again into several sub-types. A key is provided for separating these. As to Anopheles the author comes to the tentative conclusion that *A. quadrimaculatus* and *punctipennis* generally occur in waters that are poor in Desmids and that they are unusual or sporadic in other waters. The larvae of *A. walkeri* on the other hand generally occur in waters rich in Desmids.

[Every malarialogist will be glad to see the ecology of Anopheles looked at by a fresh pair of eyes, but one cannot feel that the author has proved his point for there are three reasons against using the Desmids as indicator plants: they can only be seen with a microscope, their populations change rapidly and they are at present very

imperfectly known. Indeed, the author discovered a number that were new to the U.S.A. during this investigation and was only able to identify half of the species he found.] *P. A. Burton.*

HING (W. V.) Varieties of *Anopheles crucians* Wied.—*Amer. J. Trop. Med.* 1939 Sept. Vol. 19 No. 5 pp 461-471 With 2 figs.

WILSON (Bagster) Infection and Immunity in Some Tribes of Tanganyika.—Reprinted from *Acta Conventus Tertii de Tropicis Atque Malariae Morbis*. Amsterdam, 1939 Pt. 2. pp 346-354 With 3 figs.

This paper deals with the variations in malaria reaction observed in some untreated Bantu communities. Three tribes are selected, the Digo living between the coast and the first foot-hills the Nyeramba living in the centre of Tanganyika on the Iramba plateau about 3,500 feet high and the Sonjo living on the western shore of Lake Natron, at about the same altitude as the Nyeramba. Some of the relevant endemic indices are tabulated —

	Parasite Rate (off-season) per cent.		Spleen Rate (off-season) per cent.		Infant Infection Rate per cent.
	est. 1-10	adults	est. 1-10	adults	
Digo	91.2	48.0	85	39	87.5
Nyeramba	72.5	15.6	87	68	25.5
Sonjo	41.6	10.6	77	80	—

Parasite Counts per cmm

Age in years	Digo		Nyeramba	
	Off Season	Malaria Season	Off Season	Malaria Season
0-1	6,526	8,354	5,000	14,140
1-10	2,394	2,245	1,465	3,553
11-20	364	284	294	1,456
Over 20	175	180	348	1,008

The significant difference in environment of these three tribes concerns anopheline infestation. In all cases *A. gambiae* is the vector. *A. gambiae* is always present in the houses of the Digo 1 to 15 per house and malaria transmission is continuous. On the Iramba Plateau there are no anophelines in the houses for several months and but few in the transmission season transmission is seasonal. In the Sonjo country *A. gambiae* is absent in the dry season.

The adult Digo has developed an immunity dependent upon, and effective against, frequent reinfection with *P. falciparum*. In the case of the two other tribes infection is not sufficiently frequent to establish and maintain a firm immunity against this parasite. After 2 to 3 years of age the Digo does not suffer from malaria. Clinical treatment is only necessary in early childhood pending the acquisition of immunity but should not be intensive enough to hinder such

acquisition In areas in which frequency of infection or anopheline infestation is sufficient to confer only partial immunity the control of anophelines may be practicable and treatment of the sick will certainly be required N IV

SINTON (J A) HUTTON (E L.) & SHUTE (P G) Studies of Infections with *Plasmodium ovale* II—Acquired Resistance to *ovale* Infections.—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol. 33 No 1 pp 47-68. [38 refs.]

In a previous communication the authors gave an account of 108 primary infections with *P. ovale* induced in the practice of malaria therapy and showed that their European patients had very little natural resistance to such infections [this *Bulletin* 1940 Vol. 37 p 54] Reinoculation with either homologous or heterologous strains of the same parasite were carried out on 53 of these patients and the results are recorded Both blood and mosquito parasites were used in determining the degree of resistance conferred by the primary infection The same four strains were used emanating from the Belgian Congo Nigeria, Sierra Leone and the Gold Coast immunologically they were not markedly heterologous Most of the primary infections ran their course untreated a few patients received a curative course of quinine after they had had the ten to twelve febrile paroxysms required.

Among 86 primary blood inoculations failure to detect parasites in the blood was only twice experienced among 19 patients reinoculated by this method blood parasites could be found in only four None of the 22 primary inoculations with mosquito parasites failed 35 per cent. of the reinoculations with mosquito parasites failed. In 85 per cent. of successful reinoculations the maximum parasite prevalence never rose as high as 1 per 100 fields of the thin film in primary infections only 4 per cent stayed at this low level. In 82 per cent. of primary cases maximum parasite prevalence varied from 8 to 100 per 100 fields the maximum prevalence in an untreated primary case was 160 as compared with a maximum of 12 in a reinoculated case.

The average duration of parasite incidence in 45 untreated primary cases was 25 days as compared with 5.7 days in the 26 successful secondary inoculations also untreated. The average parasitic incubation period in both primary and secondary infections was 15 days.

The clinical symptoms consequent on reinoculation were mild and recovery was spontaneous. Of the 53 reinoculated persons only 18 developed fever and in three of these it was doubtful whether the slight fever was due to malaria the average duration of fever in these 18 cases was only 4.5 days. In only 5 of the reinoculated cases did the fever attain 104°F

Infection with *P. ovale* thus confers marked resistance to reinoculation with both homologous and heterologous strains against the latter the resistance is more effective than is the case with either *P. vivax* or *P. falciparum* N IV

MANDEKOS (A. G.) Malaria and Mortality among Young Children in East Macedonia (Greece).—*Riv di Malariaologia* Sez. I 1939 Vol. 18 No 2. pp 125-130

With the idea of assessing the importance of malaria as a cause of mortality among children under 7 years of age seven villages in

each of two areas in Macedonia the Chrysoupolis Plain and the Philippi Plain, were kept under observation for seven years. Up to 1932 these two areas were almost equally malarious in that year drought much reduced the prevalence of the chief vector *A. stephensi* in the Philippi Plain, with the result that in the three subsequent years the parasite rate of children under 15 years was 35.18 and 10 per cent as compared with 65.00 and 62 per cent. in the villages of the Chrysoupolis Plain. In 1933, 1935 and 1936 the general mortality among children was higher in the Chrysoupolis Plain. In 1932 and 1934 there was no significant difference. More detailed observations in the Chrysoupolis villages showed that the general mortality rate among children who harboured malaria parasites was no higher than among the others. It is probable that the former received more medical attention. Infant mortality in malarious areas does not appear to be much influenced by economic status. N 11

DAS GUPTA (B. M.) Malarial Infection in the Placenta and Transmission to the Foetus.—*Indian Med. Gaz.* 1939 July Vol. 74 No. 7 pp. 397-399 With 2 plates (1 coloured)

The author discusses a case of congenital *Plasmodium vivax* infection already recorded by him [this *Bulletin* 1939 Vol. 36 p. 1006] in the light of certain observations he has made on the failure of a *P. knowlesi* infection to pass from the maternal to the foetal circulation in the case of a pregnant monkey. As has been observed in the case of human malaria by BLACKLOCK and GORDON GARRHAM and others [see this *Bulletin* 1928 Vol. 23 p. 130 1939 Vol. 36 p. 492] the maternal blood in the placenta of the monkey was massively infected with parasites while the foetal blood and organs were free from parasites. The foetus gave no evidence of anaemia, in marked contrast to the profound anaemia of the mother. It is suggested that the duration of the infection rather than its intensity is the factor influencing the passage of parasites from maternal to foetal blood. In the human case the mother had suffered repeatedly from malaria throughout her pregnancy while the monkey had had but one acute attack. The author believes that the placental barrier is injured by a chronic rather than an acute infection. The paper is illustrated by a number of microphotographs and a coloured plate showing the condition of the placenta of the monkey. C. M. Wemyss

GHIZZETTI (Carlo) Anemia perniciosa progressiva e malaria. [Progressive Pernicious Anaemia and Malaria].—*Pathologica*. 1939 Apr. 15 Vol. 31 No. 570 pp. 160-163 English summary (2 lines)

This is the description of a patient who presented all the classical symptoms and signs of an advanced case of pernicious anaemia: the red cells numbered 1,035,000 and the haemoglobin (Fleischl) was down to 25. The blood picture was typical with the addition of very rare *P. falciparum* parasites. Treatment with atebem and plasmoquine produced a remarkable cure. The author discusses similar cases reported in the literature. N 11

JAMES (Clifford S) Malarial Nephritis (Nephrosis) in the Solomon Islands and Mandated Territory of New Guinea.—*Med J Australia* 1939 May 20 26th Year Vol. 1 No 20 pp 759-761

During ten years practice in the Solomon Islands and in New Guinea the author has treated 22 cases of malarial nephritis the total number of patients admitted for all causes during this time was 6,518. With one possible exception no other case of nephritis of any kind was seen. All the patients were natives of the south western Pacific. Of the 22 patients 17 were under seven years of age. The spleen was enlarged in all cases in 15 cases it extended to or below the umbilicus. Malaria parasites were found in 15 cases *P. malariae* in 9, *P. malariae* and *P. vivax* in 2, *P. malariae* and *P. falciparum* in 2, and ring forms of undetermined species in 2. The chief symptoms were oedema, ascites, albuminuria and anaemia. The history of the nephritic symptoms was short of malaria long. Albuminuria varied with the severity of the oedema. In mild cases the volume was one-eighth to one-sixth in severe cases from one-third to one-half. Hyaline and granular casts were found. In half the cases red cells were found when the urine was centrifuged. Fifteen cases were severe. When quinine was given by mouth to the first eight cases five died. Of the 14 cases treated with intramuscular injections of quinine only one died of intercurrent disease.

N W

ROSENTHAL (Eugene) Activation of Malaria by Vaccines. [Correspondence].—*Lancet* 1939 June 17 pp 1403-1404 With 1 chart

This is a description of the activation of a latent *P. vivax* infection in a patient suffering from ulcerative colitis by the injection of an autogenous vaccine.

N W

SANDERS (J. P.) & DAWSON (W. T.) Observations on Five-Day Quinine Treatment of Malaria.—*Southern Med J* 1939 July Vol. 32 No 7 pp 693-696 [15 refs.]

Relapses within a year following the treatment of malaria with 20 grains of quinine sulphate daily for five days vary from 25 to 45 per cent. The observations were made in Louisiana and Texas. Fever is suppressed as rapidly as with much larger initial doses of quinine. A dose of 10 grains was almost as effective as 20 grains in this respect.

N W

1. FARINAUD (E.) & ELICHE (J.) L'utilisation des dérivés de la sulfamide dans le traitement du paludisme [Sulphamide Derivatives in the Treatment of Malaria].—*Rev Méd Française d'Extrême-Orient* 1939 Mar No 3 pp 220-234 With 15 charts.

11. — & — Nouvelles observations sur le traitement du paludisme par les dérivés de la sulfamide.—*Bull Soc Path Exot* 1939 June 14 Vol. 32 No 6 pp 674-681 With 3 figs

i. Fifteen patients in the Maternity hospital of Saigon-Cholon who had acute attacks of malaria during the lying-in period were

treated with intravenous injections of soluseptasine either alone or reinforced with the oral administration of septasme or of quinine or quinaquine. The cases are described in detail. The authors conclude that these derivatives of sulphamide have a remarkable schizonticidal activity— in from 3 to 5 hours there is a total disappearance of schizonts from the peripheral blood. They have no action at all on the sexual forms of *P. falciparum*. The gametes of *P. vivax* are however sensitive to the action of septasme. These drugs are not efficient antipyretics; they are thus incomplete remedies but their marked action on schizonts gives them an important place among anti-malaria remedies.

II. This is a shorter account of the same work.

N IV

CHOPRA (R. N.) DAS GUPTA (B. M.) SEN (B.) & HAYTER (R. T. M.)
 Prontosil in Indian Strains of Malaria.—*Indian Med Gaz.* 1939
 June Vol. 74 No. 6 pp. 321-324

The authors have treated 19 cases of malaria with prontosil. They find that the drug given in doses of 3 to 4 gm. daily for five days causes the disappearance of parasites from the peripheral blood and controls the symptoms of the disease. It destroys both sexual and asexual forms of *P. vivax* and *P. malariae*; it has no action on the gametocytes of *P. falciparum*. Its action on *P. malariae* is slow. When doses of 1.5 to 2 gm. daily for five days were given fever and parasites disappeared but recrudescences occurred within a fortnight. The conclusion is that prontosil possesses mild anti-malarial properties against Indian strains of malaria. [See also this *Bulletin* 1939 Vol. 36 pp. 12, 260, 369, 400, 783, 788, 814, 825]

N IV

CLEVELAND (D. E. H.) & TURVEY (S. E. C.) Use of Mapharsen for terminating Malaria Artificially Produced by Inoculation.—*Arch Dermal & Syph.* 1939 June. Vol. 39 No. 6. pp. 1043-1044

If mapharsen be used to terminate artificially induced malaria relapse should not be placed on a single dose—relapses are likely to occur. In place of the course of quinine followed by araphenamine commonly administered, the authors recommend a full course of mapharsen. [See also this *Bulletin* 1939 Vol. 36 p. 398]

N IV

FARINAUD (E.) LATASSE (C.) BACCIALONE (L.) & CANET (J.) Le comportement de la quinaquine dans l'organisme au cours du traitement anti-palustre. Rapport entre la concentration sanguine et l'élimination urinaire de la quinaquine. [Behaviour of Quinaquine in the Body during Malaria Treatment: Relation between Blood Concentration and Urinary Excretion of the Drug].—*Bull. Soc. Path. Exot.* 1939 May 10 Vol. 32, No. 5 pp. 513-519 With 2 figs

This is a rather more detailed account of work already published [see this *Bulletin* 1939 Vol. 36 p. 816]

SMITH (S.) The Treatment of Malaria in a Military Population with the Synthetic Preparations.—*Proc. Roy. Soc. Med.* 1939 July Vol. 32, No. 9 pp. 1077-1082 (United Services Sect. pp. 19-24)

TOUMANOFF (C) & HOANG-TICH TRY Au sujet de la concordance entre l'indice gamétique et le pourcentage des moustiques infectés dans la zone à *minimum* au Tonkin [Relation of Gamete Index to Percentage of Mosquitoes Infected in 4 *minimum* Areas of Tonking.]—*Rev Méd Française d'Extrême Orient* 1939 Mar No 3 pp 280-284 With 1 chart

A study has been made of the large amount of material collected by the Anti-malaria Service of Hanoi to determine what relationship exists between the gamete index and the infection rate of *A. minimum* when both have been determined simultaneously. It was found that in places in which the gamete index was below 10 per cent the infection rate was 4.08 per cent. In places in which the gamete index was from 10 to 20 20 to 30 30 to 40 and above 40 the corresponding infection rates were 4.51 4.84 5.55 and 7.68. It would thus appear that were one to reduce the gamete index from 40 per cent to less than 10 per cent one would thereby produce an almost negligible reduction in the infection rate of mosquitoes. Malaria prophylaxis cannot therefore in such places be limited to medical measures the contact between man and the anopheline vector must be reduced as much as possible by efficient antilarval measures. If this be done drug prophylaxis can help.

N 17

AZIZ (Mehmed) The Water-Paris Green Mixture in Anopheline Control in the Tillyria Area, Cyprus—Govt of Cyprus Med Dept Papers No. V 16 pp With 10 figs. 1939 Nicosia Govt Printing Office & London Crown Agents for the Colonies 4 Millbank SW 1 [1s.]

The author has found that a uniform suspension is readily obtained by shaking Paris green in water and that better results are obtained by spraying this suspension on anopheline breeding places than are given by the usual dusting methods. The author's description of making the stock solution (page 6) is not intelligible apparently the strength of the suspension sprayed is about 1 gm to the litre. The advantages of the method are economy in Paris green (only a third or a quarter of the amount used in dusting is required) much saving of time and labour and there is much less danger of the personnel suffering from arsenical poisoning than there is when the dusting method is used. The results obtained were very satisfactory and it is proposed to extend the application of the method next year.

N 18

SERGEANT (Etienne) Du cannibalisme des gambouses et d'un moyen d'y remédier [Cannibalism of Gambusia and a Method of preventing it.]—*Arch Inst Pasteur d'Algérie* 1939 Mar Vol 17 No 1 pp 189-192 With 2 figs

The voracity of *Gambusia* is such that if they are not placed in a sufficient quantity of water they may devour their young. To circumvent this obstacle to breeding the author has devised an ingenious expedient. A cylindrical cage 25 centimetres long and 25 centimetres in circumference is made of galvanized metal grill with a square mesh of 3.5 millimetres. One end of the cylinder is closed with gauze the other with a large cork. The cage is immersed in water to it is attached a thread with a float. Gravid female *Gambusia* with the characteristic black abdominal marking are placed in the cage during

Results showed that the several diluents differed considerably. Distilled water was slightly less harmful to the virus than hormone broth. Normal saline was definitely harmful in one hour. When a 10 per cent. normal serum was added to a diluent its unfavourable effect on the virus was reduced. Serum tyrode solution was found to be the least harmful of the diluents tested and the most regular in its action. Serum water was only slightly less satisfactory and is recommended on account of the ease of its preparation. The results of these experiments, as given in the protocols, are amazingly consistent.

From experiments performed on 40 rabbits JORDAN PEDERSEN and SHU⁴ suggest that ultra violet light "could be used with great efficacy in the cauterization of rabies bites. The experiments are unfortunately too few for sound deductions to be drawn and can only be said to represent an indication that further experimentation might prove this technique to be of considerable value." The results are summarized as follows —

	Number of Animals	Deaths	Rabies Deaths	Percentage rabid
Controls	9	5	5	55.55
Treated	31	12	7	22.58

[From this table, excluding animals which died from causes other than rabies one finds $P=0.1$ which indicates that the observed difference was not significant.]

The authors intend at some future date to irradiate certain of the rabbits with coem and some without, in order to exclude the possibility that the coem itself acted as a lethal agent.

The high degree of virulence exhibited by strains of street virus in Rumania has on various occasions been alluded to by JOANESCO⁵ [this *Bulletin* 1933 Vol. 30 p. 136 1933 Vol. 32, p. 178 and 1939 Vol. 36 p. 194]. During the year 1938 he has studied 31 local strains of street virus. From this examination he finds that the mean incubation for rabbits inoculated intracerebrally is 11 days. Of the 31 strains 28 showed incubations of less than 15 days, of which 7 were less than 7 days. Two strains were fixed from the 1st passage with incubations of 3 and 4 days. Eleven strains were fixed from the 2nd passage. Thus strains of high aggressiveness are common in Rumania. JOANESCO goes on to describe 3 cases in which generalized papulo-vesicul eruptions followed treatment. The method of preparation of the vacci was that of Babes.

ii. Symptoms and Diagnosis.

A case of hydrophobia in which the patient exhibited in the ear stages symptoms of mental abnormality is described by EVANS⁷ and second with an unusually short incubation period by SHIELDS⁸

- JORDAN (J. H.) PEDERSEN (H.) & SHU (S.). Bites of Rabid Animals treated by Experimental Caustery with Ultra Violet Rays and Eosin.—*Trans. R. Soc. Trop. Med. & Hyg.* 1939. July 28. Vol. 33 No. 2. pp. 233-24.
- JOANESCO (Dimitrie). Notes sur la rage.—*Arch. Roumaines Path. Experim. Microbiol.* 1938. June Vol. 11 N. 2. pp. 199-206. With 3 figs.
- EVANS (W. S.). A Case of Hydrophobia.—*Jl. Roy Army Med Corps.* 193 Sept. Vol. 73 No. 3 pp. 194-195.
- SHIELDS (J.). An interesting Case of Rabies.—*Jl. Roy Army Med Corps.* 1939 July Vol. 73. No. 1 pp. 54-55.

A note by JORDAN⁹ contains charts showing the incubation periods of a number of treated and untreated cases collected from the statistics of the Shanghai Institute. The second shows two peaks one at the 30th and the other at the 60th day. Unfortunately the position of the bite has not been taken into consideration.

A method of preparing and fixing by the wet method specimens for the rapid demonstration of Negri bodies is described by FARACO¹⁰. The technique is as follows —

(1) A portion of nerve material rich in cells is picked out and dipped into 20 per cent. formalin for 2 or 3 minutes, puncturing the material with a suitable instrument in order to facilitate penetration of the fixative.

(2) The tissue is transferred to another dish containing 10 per cent ammonia and again punctured until it becomes soft and viscid.

(3) Excess of fluid is removed by smooth filter paper and the material is placed on a slide near one extremity.

(4) With a slide as a spreader a smear preparation is made.

(5) The slide is inverted and placed in contact with an adequate fixative (Heidenhain's fluid has given the best results) for from 3 to 10 minutes.

(6) Dehydrate and clear by 95 per cent. alcohol absolute alcohol and xylol.

The film is then stained by Mann's method care being taken that before the stain is applied, any precipitate arising from the fixative is removed. An advantage of this method is that it can be applied to tissues sent in glycerine Bedson's liquid, etc. No illustrations are given but it appears from the text that the neurones with their processes are beautifully demonstrated, the Negri bodies appearing as beads in the protoplasmic filaments.

Experiments have been conducted by SULKIN and NAGLE¹¹ with a view to obtaining a method by which putrefied brain substance may still be utilized for animal experiment. As microscopical examination is under these circumstances often impossible or at best unreliable the only possibility is to kill the bacterial flora by sterilization. After preliminary experiments with various disinfectants (merthiolate glycerin phenol and ether) it was found that ether was the most desirable. Its bactericidal effect on organisms in contaminated brains was first determined and it appeared that in a 10 per cent concentration ether exerted a definite bactericidal effect after exposure for two hours at 4°C. Exposure to this concentration for 18 hours at the same temperature had no effect upon the virulence of two strains of street virus tested. Nine grossly contaminated dog brains have been examined by this method 4 mice being used in each case as test animals and in each case a positive diagnosis was given.

⁹ JORDAN (J. H.) Prognosis in Rabies.—*Lancet*. 1936 Oct. 21 pp. 884-885 With 1 chart.

¹⁰ FARACO (José) Nova tecnica para a obtenção de esfregaços por compressão e distensão "de partes do encephalo, medula espinal, etc. para a pesquisa de corpusculos de Negri. Coloração rapida dos esfregaços pelo methodo de Mann.—Reprinted from *Rev Biol e Hyg* 1938 Vol. 9 No. 2. pp. 90-96. English summary.

¹¹ SULKIN (S. Edward) & NAGLE (Nathan) Demonstration of Rabies Virus in Grossly Decomposed Animal Brains.—*Jl Lab & Clin. Med.* 1939 Oct. Vol. 25 No. 1 pp. 94-98. [13 refs.]

GREENE and BREAKALE¹² recommend that preparations of cord be used for the demonstration of Negri bodies.

Using the method of WEBSTER and DAWSON (this *Bulletin* 1935 Vol. 32, p. 608) with some slight modification, SULKIN and WILLETT¹³ find from extensive comparative experiments that the white mouse is superior to the guinea pig as a test animal. For a diagnosis of experimental infection to be dependable it must include the demonstration of Negri bodies, as clinical symptoms in the mouse are apt to be variable and indefinite. In order to save time accuracy of diagnosis is not lost by sacrificing mice on the 8th or 9th day after inoculation.

iii. Pathology

DA COSTA¹⁴ concludes that the production of rabidical substances in the blood of treated dogs depends upon (1) whether the vaccine used is living or dead, (2) the dose given (3) the route of inoculation, and (4) the number of injections. He was successful in demonstrating the presence of rabidical substances with 5 per cent. and 20 per cent. living vaccines and with 10 per cent. but not with 5 per cent. dead vaccine. These conclusions are based upon experiments in which groups of dogs varying in number from 2 to 4 were employed.

iv. Methods of Treatment and Statistics.

Using the mouse test described below WEBSTER¹⁵ has carried out comparative tests of the efficacy of various methods of immunization applied to the treatment of man or of animals. The test is as follows —

(a) Dilute the vaccine tenfold. (b) Segregate sixteen 3 weeks old Swiss mice [an inbred laboratory strain] for vaccination and sixteen of the same age as controls. Provide at least five additional 2 weeks old mice for the virulence test. (c) Inject the 2 weeks old mice intracerebrally with 0.03 cc. of the diluted vaccine to determine the presence of virulent virus. (d) If the vaccine is designed for the treatment of man, inject sixteen mice with 1/8th the stated dose of diluted vaccine intraperitoneally for 3 to 6 days. If the vaccine is for canine prophylaxis inject a single dose of 1/8th of the stated amount. (e) 3 weeks after the first injection test vaccinated mice plus controls with 2, 4, 8 and 16 intramuscular lethal doses of virulent virus respectively (or 1, 10 and 100 intracerebral lethal doses)."

The results are as follows —

Virulent virus injected intraperitoneally as a vaccine (Hogyes and Harris) immunized mice within 10 days and for a period of at least 9 months. Subcutaneous administration was not so successful. The margin between immunizing and infecting dose of vaccine is small.

Commercial vaccines inactivated with phenol in general failed to immunize mice. None contained virulent virus. The phenolized preparation from one commercial firm however and the chloroformed preparation from another immunized mice consistently when given

¹² GREENE (Robert A.) & BREAKALE (Edward L.) Preparations from the Spinal Cord in the Laboratory Diagnosis of Rabies — *Jl. Lab. & Clin. Med.* 1939 Oct Vol 25 No 1 p. 102

¹³ SULKIN (S. Edward) & WILLETT (Joseph C.) A Comparative Study of the Mouse and Guinea Pig Inoculation Methods in the Diagnosis of Rabies — *Amer. Jl. Public Health* 1939 Aug Vol 29 No 8 pp. 921-928

¹⁴ DA COSTA (A. Monteiro) Vaccination antirabique du chien. I. Pouvoir rabicide d'un sérum après injection de différents types de vaccin — *Archives Inst. Bact. Comens. Pasteur* 1936 Vol 7 N° 3 pp. 397-411

¹⁵ WEBSTER (Leslie T.) A Mouse Test for measuring the Immunizing Potency of Antirabies Vaccines — *Jl. Experim. Med.* 1939 July 1 Vol 70 No 1 pp. 87-106 With 2 figs

intraperitoneally in quantities approximating 5 times that advocated per gm of body weight in man

Commercial canine vaccines inactivated with phenol proved non-virulent but failed to immunize mice. Commercial canine vaccines inactivated with chloroform proved non virulent but capable of immunizing mice provided a single intraperitoneal injection of 2 to 5 times that prescribed for dogs per gm of body weight was given. Chloroform vaccines proved irritative to the peritoneum of mice.

By an ingenious method of procedure BEHRENS SCHWEIGER BARKER and REEVES¹⁶ have been able to remove about 60 per cent of nervous tissue from rabies vaccine. In order that the emulsions used should be as homogeneous as possible an elaborate procedure was adopted for the details of which the reader is referred to the original paper. Experiments showed that 0.5 cc in dilutions up to 1:25,000 injected intracranially into rabbits caused rabies with certainty. Experiments were then carried out with the object of removing suspended foreign tissue by isoelectric point precipitation. Diluted citric acid solution was employed for this purpose. It was found that 1 cc of one hundredth molar citric acid solution to 30 cc. of homogeneous emulsion removed about 60 per cent of the protein. Water clear suspensions of the rabies virus having satisfactory antigenic properties have been prepared. The m.l.d. of these increases as the percentage of protein diminishes. Emulsions are rendered avirulent after exposure to pH 5 for 24 hours at 25°C. It was found that immunized rabbits can withstand 2 m.l.d. but not 4. Fifty per cent. of animals vaccinated daily with 10 cc of avirulent purified vaccine for 10 days are immune to 3 m.l.d.

Following the technique suggested by Frau OTTEN VAN STOCKUM [this Bulletin 1935 Vol. 32, p. 612] BOYCKER¹⁷ has carried out a series of experiments to test the effects of a formalized vaccine administered prior to the infecting dose. Rabbits were treated with a rabbit vaccine containing 1:25 per cent formalin and then after various intervals of time subjected to an intramuscular dose (except in 2 animals where the dose was subcutaneous) of test virus (in 11 cases fixed virus was used in the remainder street virus). The summarized results are as follows —

Dosage of Vaccine	Deaths		Survived	Total
	Rabies	Intercurrent		
700 mgm. treated Controls	1	0	24	25
	7	0	1	8
1300-2800 mgm. treated Controls	8	0	25	33
	4	7	34	45
	13	2	1	18
	17	9	35	61

¹⁶ BEHRENS (C. A.) SCHWEIGER (L. B.) BARKER (J. F.) & REEVES (J. L.)
Immunization against Rabies using Avirulent Purified Vaccines.—*J. Infect Dis.* 1939 May-June, Vol. 64 No. 3 pp. 252-260. With 1 fig.

¹⁷ BOYCKER (Eduard) Tierversuche zur Frage der immunisatorischen Wirkung von Wutschutimpfstoffen aus formalinisiertem Virus fixum.—*Ztschr. f. Hyg. u. Infektionskr.* 1939 July 10 Vol. 121 No. 6, pp. 735-742.

and the author concludes rightly, that the results are very satisfactory. The only difference from VAN STOCKUM's method is that rabbit brain virus was used instead of monkey brain virus as a vaccine.

The statistics of antirabic treatment during the year 1937 in the French Colonies are shortly summarized in a publication by the French Colonial Ministry.¹² These cover 9 treatment centres in French West Africa, 2 in French Equatorial Africa, and 6 in Indo-China.

SALEUN¹³ reports that during the year 1938, 36 persons were treated at the Institute in Brazzaville (French Equatorial Africa) none of whom died.

BRUNI and BUDA¹⁴ report, as the result of numerous experiments that parammophenylsulphamide (Streptosil) has no action either *in vitro* or *in vivo* on rabies virus.

v. Post Vaccinal Paralysis

A note in answer to a query on the prevalence and types of paralytic sequelae to antirabic treatment is given in the *Journal of the American Medical Association*.¹⁵

vi. Miscellaneous

It is pointed out by DENISON & DOWLING¹⁶ that the incidence of rabies among animals in Birmingham Alabama (U.S.A.) has steadily risen during the last 10 years. The problem is discussed mainly from a veterinary point of view.

A popular article summarizing measures for the prevention of rabies in its social and legal aspects is contributed by CRUVEILLIER.¹⁷

A. G. McKendrick

¹² VOGL (E.) & RIOU (M.) Les maladies épidémiques, endémiques et sociales dans les colonies françaises pendant l'année 1937. RAGE—*Ann. de Méd. et de Pharm. Colon.* 1939 Apr. Vol. 37 Supplément, pp. 479-487.

¹³ BRAZILVILLE. AFRIQUE ÉQUATORIALE FRANÇAISE. RAPPORT SUR LE FONCTIONNEMENT DE L'INSTITUT PASTEUR DE BRAZILVILLE PENDANT L'ANNÉE 1938 [SALEUN (G.)] pp. 25-31.—RAGE.

¹⁴ BRUNI (Augusto) & BUDA (Luigi). Azione della parammofenilsulfamide sul virus fuso della rabbia e sul virus vaccinale.—*Settimana Med. Palermo* (formerly Riv. Scienze Sperimentali) 1939 Sept. 21 Vol. 17 No. 38 pp. 1151-1153.

¹⁵ JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1939 Nov. 4. Vol. 115 No. 19 p. 1754.—Paralysis after Rabies Vaccine. [Querrin & Minor Notes.]

¹⁶ DENISON (George A.) & DOWLING (J. D.) Rabies in Birmingham, Alabama. Human Mortality as affected by Antirabic Treatments.—*Jl Amer Med Assoc* 1939 July 29 Vol. 113 N. 3 pp. 360-365 With 1 chart.

¹⁷ CRUVEILLIER (L.) Défenses contre la rage et réglementation en France.—*Mémoires Seminaires* 1939 July Vol. 16 No. 183 pp. 343-354.

RELAPSING FEVER.

PRECIS OF ABSTRACTS IN THIS SECTION

KIRK (p. 188) shows that louse-borne relapsing fever is not endemic in the Sudan but has been introduced from time to time from Egypt, French West Africa and Abyssinia. In recent years it has been

confined to negroid labour immigrants from the west. Tick borne relapsing fever may be present in the south but not in the north. SCAFFIDI (p 198) notes that the relapsing fever of the highlands of N Ethiopia is house-borne.

ORDMAN (p 198) describes an outbreak of 1 800 cases of tick borne relapsing fever in Cape Province. Symptoms and post mortem findings were typical and the disease disappeared after measures had been taken against *O. moubata* in the barracks concerned.

DUBOIS and PEARSON (p 199) discuss variations in the power of a strain of *S. duttoni* to produce residual brain infections in mice. SAUTLET (p 199) shows that rats fed on brain from other rats infected with *S. duttoni* may develop brain infections without other signs. In nature non apparent spirochaetosis including syphilis may be the result of unusual methods of infection.

CHABAUD (p 200) studied the course of infection of fowl embryos with *S. duttoni* and *L. icterohaemorrhagiae*. Both organisms multiply but the embryo dies within 8 days. On the other hand OAG (p 200) found that though fowl embryos could be infected with *S. duttoni* the embryos were not killed. Newly hatched ducks and adult fowls were not susceptible.

BRUMPT (p 200) describes *S. babylonensis* a new species from Iraq which though resembling *S. hispanica* in some respects differs from it in cross immunity reactions and in being transmitted by *O. asperus* but not by *O. tholozani* or *O. erraticus*. On the other hand it can be transmitted by the American species *O. turicata*. BRUMPT and BRUMPT (p 201) have established the identity of the Mexican and Texan strains of *S. turicatae* by cross immunity tests. It can only be transmitted by *O. turicata* in America. BRUMPT *et al* (p 201) found 7 of 15 lots of *O. turicata* collected in Mexico to be infected with *S. turicatae*.

DAVIS (p 202) found infection with 6 strains of spirochaete capable of infecting white mice, white rats and guinea-pigs in *O. parkeri* from rodent burrows in U.S.A. This tick may therefore be a vector to man. He (p 202) finds that guinea-pigs may be infected with spirochaetes derived from *O. turicata*, *O. parkeri* and *O. hermsi*.

The work done by BONÉ (p 203) confirms the view that the usual method of infection when a tick feeds is by the excretion of the coxal fluid containing spirochaetes. He discusses the life-cycle of the spirochaetes in the tick and points out that the granules present in the Malpighian tubules are found also in non-infected ticks.

BRETT (p 203) found under experimental conditions that the early stages of *O. moubata* prefer high to low humidity conditions. The humidity of sand or soil or cracks in walls may be much higher than that of the outside air.

OMORI (p 204) considers that the mite *Liponyssus nagoyoi* may play a part in the transmission of *S. duttoni* in epidemics in Formosa, though it is not infective by bite or the injection of faeces. In mice infection can be conveyed by ingestion of crushed infected mites or by rubbing these on the shaven skin. SIVRON and SKUTE (p 204) record the finding of a heavy infection of the salivary glands of a specimen of *A. maculipennis* var. *atroparvus* with a spirochaete morphologically indistinguishable from *S. culicis*. Injection into a man failed to cause infection.

MURRELL (p 205) records a positive Wassermann reaction due to *S. moraxi*.

SCAFFIDI (p. 205) reports symptoms of lobar pneumonia with spirochaetes in the blood and sputum, during the course of relapsing fever in Ethiopia. He (p. 205) also records atypical cases, some of which were associated with other diseases. C IV

KIRK (R.) The Epidemiology of Relapsing Fever in the Anglo-Egyptian Sudan.—*Ann. Trop. Med. & Parasit.* 1939 July 20. Vol. 33 No. 2 pp 125-140 With 2 figs. (1 map) [43 refs]

A useful account of the history of relapsing fever in the Sudan, which is of especial interest from an epidemiological point of view since the Sudan is surrounded by countries from which it is separated physiographically, and in which the disease is endemic.

Louse-borne relapsing fever was introduced into the Sudan during 1906 to 1924 from Egypt in 1926 from French West Africa, during the great historic epidemic of relapsing fever across central Africa and in 1936 from Italian East Africa the latter infection being a consequence of the war in Abyssinia.

There is no evidence that louse-borne relapsing fever is endemic in the Sudan and each time it has appeared its origin can be traced to infected immigrants from adjoining countries.

During the last 12 years the disease has been confined almost entirely to negroid immigrants from the Western Sudan and French West Africa who travel about as labourers. The disease shows a tendency towards seasonal incidence after the rains, which may be correlated with the movements of these workers. Epidemics of typhus are unknown.

Whilst infections in the Southern Sudan may be carried by ticks, there is no evidence that they have played any part in the epidemiology of relapsing fever in the Northern Sudan. R Hindle.

SCAFFIDI (Vittorio) Jr Caratteri della febbre ricorrente dell'altopiano nord-etiopeo [Relapsing Fever in the Highlands of Northern Ethiopia].—Reprinted from *Archivio Sci. Med.* 1937 Oct Vol. 64 No. 4 pp. 333-394 With 14 charts [27 refs]

Relapsing fever in the highlands of northern Ethiopia is louse-borne, *Ornithodoros* not being found at a height of 2,200 metres. The author analyses the symptoms present and gives charts of typical cases and also some of greater interest of patients suffering from coincident relapsing fever and malaria in whom the crisis of the former is followed by irregular fever due to the presence of *P. falciparum*. H H S

ORDMAN (David) African Relapsing Fever in South Africa. An Outbreak of African Relapsing Fever in the Cape Province.—*South African Med. J.* 1939 July 8. Vol. 13, No. 13 pp 491-498 With 5 figs [10 refs]

The record of an outbreak of African relapsing fever (*S. duttoni*) in the Native Labourers on a mine about 20 miles from Postmasburg in the North-Western area of the Cape Province.

This outbreak involved approximately 1,800 cases of the disease with 160 deaths. It began in the spring of 1936 when, in a population of about 1,800 more than 4 per cent. per month were invalided. This rose during 1937 to over 15 per cent. the outbreak being especially

prevalent during the summer months. Its nature remained unrecognized for about 16 months after which preventive measures were instituted.

The symptoms were typical of African relapsing fever and spirochaetes were present during the febrile attacks. Post-mortem studies showed signs of severe toxæmia with marked cloudy swelling of heart muscle kidneys and liver. The spleen was sometimes enlarged and showed considerable fibrinous exudate on the surface or adhesions to the surrounding tissue. Congestion and some oedema of the brain was present. The disease responded to intravenous injections of 0.45 gm. N.A.B. given either in the initial stages of the fever or at the onset of a relapse.

Very large numbers of *Ornithodoros moubata* were found in the barracks occupied by the Natives and there is little doubt that the ticks were responsible for the infection. The disease disappeared after preventive measures against these parasites had been carried out.

The author also reviews the present-day knowledge of the occurrence of African relapsing fever in South Africa which is evidently of only very sporadic occurrence in that country. E H

DUBOIS (A) & PEARSON (Y) Variabilité du neurotropisme d'une souche de *Spirochaeta duttoni*. Immunité en l'absence de neurotropisme. (Variability of the Neurotropism of a Strain of *Spirochaeta duttoni*. Immunity in the Absence of Neurotropism.)—C. R. Soc. Biol. 1939 Vol. 130 No. 12. pp. 1379-1381.

The authors have studied a strain of *S. duttoni* from Kwango which ten years previously regularly produced residual brain infections in mice. Subsequently it has been kept by alternate passages in ticks and mice. A strain kept in mice for 20 passages was systematically examined from the 3rd passage onwards for residual brain infections and out of 18 mice 15 brains were negative and only 3 positive. Three months later another series of passages from the same strain after 6 passages gave 8 positive and 3 negative. It would seem therefore that a strain may lose the property of producing residual infections and regain it after a comparatively short interval. With regard to immunity 16 mice of the first series were reinoculated 1 to 2 months later with *S. duttoni*. Eleven mice were completely and 3 partially immune and 2 had lost their immunity. In the second series there were 13 completely and 3 partially immune.

[The authors do not seem to have considered the possibility of variations in the susceptibility of the mice.] E H

SAUTET (Jacques) Fièvre récurrente africaine et maladies inapparentes à tréponèmes [African Relapsing Fever and Non-Apparent Spirochaetal Diseases.]—Arch. Méd. Gén. et Colon. 1939 Vol. 8. No. 3 pp. 84-87.

The author has carried out experiments with a strain of *Spirochaeta duttoni* and finds that when rats are fed with the brains of infected rats some of them develop a residual brain infection without showing any other signs of having been infected. Such rats never showed spirochaetes in the blood nor any rise in temperature yet their brains were infective when inoculated into normal animals.

It is suggested that in nature non-apparent spirochaetosis including syphilis may be the result of unusual methods of infection. E H

CHABAUD (A.) Infection de l'embryon de poule par *Spirochaeta duttoni* et *Spirochaeta icterohaemorrhagiae* [The Infection of the Fowl Embryo by *Spirochaeta duttoni* and *Leptospira icterohaemorrhagiae*].—*Bull. Soc. Path. Exot.* 1939 May 10 Vol. 32 No. 5 pp. 483-485

Employing the usual technique, developing eggs have been inoculated with strains of *Spirochaeta duttoni* and *Leptospira icterohaemorrhagiae*.

With regard to *S. duttoni* the blood of heavily infected rats or mice was defibrinated and then lightly centrifuged to remove red cells. The plasma containing the spirochaetes was then inoculated on to the chorio-allantoic membrane. Under these conditions the organisms appeared in the blood of the fowl embryo onwards from the 86th hour after inoculation, and were present in enormous numbers by the 5th day. The embryos succumbed to the infection usually by the 6th day and never survived more than 8 days although chicks are resistant to infection. By passages from one embryo to another the incubation period was reduced to 40 hours.

With regard to *Leptospira icterohaemorrhagiae* similar results were obtained, but the organisms did not appear until the 5th day and only in small numbers, but caused the death of the embryo within 3 to 7 days.

The development of both spirochaetes is much more abundant when the embryo is inoculated with defibrinated blood than when citrated blood is used. E H

OAG (R. Knight) The Growth of *Borrelia duttoni* in the Developing Egg.—*J. Path. & Bact.* 1939 Sept. Vol. 49 No. 2 pp. 339-344 With 2 figs on 1 plate

An additional confirmation of the fact that *Spirochaeta duttoni* may be cultivated in developing fowl embryos. [See CHABAUD above.]

Using this method the author has cultivated a strain continuously for 10 passages over a period of one month, and obtained abundant growths, but in no case was the embryo killed or any naked-eye changes produced in the chorio-allantoic membrane.

The spirochaetes invaded the blood stream of the embryo the condition produced being similar to that occurring in man and susceptible animals. Although the embryo is susceptible 6 newly-hatched chicks and 2 adult fowls were inoculated with negative results.

The virulence of the spirochaete in mice remained unaffected during the 10 egg transfers but repeated passages are said to increase the motility of the organisms. E H

BRUMPT (Emile) Une nouvelle fièvre récurrente humaine découverte dans la région de Babylone (Iraq) [A New Human Relapsing Fever discovered in the Neighbourhood of Babylon (Iraq)].—*C. R. Acad. Sci.* 1939 June 19 Vol. 208 No. 25 pp. 2029-2031

The author collected 3 nymphs of *Ornithodoros asperus* from the deep burrow of some medium-sized rodent in the ruins of Rish, near Babylon. The adults developing from these nymphs were fed on normal guinea-pigs and two out of the three ticks were found to be infected with spirochaetes. This strain was found to differ from other strains of relapsing fever in its biological characteristics and is considered a distinct species which is given the name *Spirochaeta babylonensis*.

In guineapigs it produces a relapsing type of infection with numerous spirochaetes in the blood thus resembling *S. hispanica* but it is distinguished by cross immunity reactions and above all by the fact that neither *Ornithodoros ikolani* nor *O. erraticus* could be infected with this Babylonian strain whilst the bite of a single *O. asperus* is sufficient to produce infection.

On the other hand the American species *Ornithodoros turicata* experimentally is found to be an efficient vicarious transmitter of *S. babylonensis* in the same way that *O. coriaceus* incapable of transmitting *Spirochaeta turicatae* in Mexico its country of origin can transmit *Spirochaeta persica* from Central Asia.

These and other examples are brought forward to show that the geographical distribution of parasitic diseases is still far from being defined and that in widely separated countries there exist susceptible beings capable of becoming very efficient vicarious carriers when brought in contact with reservoirs of infection. E H

BRUMPT (E) & BRUMPT (L C) Identité du spirochète des fièvres récurrentes à tiques des plateaux mexicains et du *Spirochaeta turicatae* agent de la fièvre récurrente sporadique des Etats-Unis. [The Identity of the Spirochaete of Tick Relapsing Fever from the Mexican Plateaux and *Spirochaeta turicatae* the Agent of Sporadic Relapsing Fever in the United States]—*Ann Parasit Humains et Comparés* 1939 July 1 Vol 17 No 4 pp 287-298

The authors have studied the biological characteristics of the spirochaete obtained by feeding *Ornithodoros turicata* from the Mexican plateaux on white rats

The strain was tested on 7 human subjects each of whom was bitten by 10 infected *Ornithodoros*. All the patients became infected after incubation periods ranging from 4 to 19 days and the number of febrile attacks ranged from 1 to 6. Various laboratory animals were infected including rats mice guineapigs rabbits dog fox cat and pig. A dormouse spermophile and hedgehog gave negative results.

In rats the virus does not seem to persist in the brain for as long as six months.

Cross immunity tests with a strain of *S. turicatae* from Texas which had been maintained for several years in *O. turicata* established the identity of the Mexican and the Texan strains.

In addition experiments were made with several vicarious species of *Ornithodoros* to test their susceptibility to infections with the Mexican strain. The only species of tick from Latin America found liable to infection was *O. turicata*. On the other hand, this same species was found capable of transmitting by bite *S. persica* and *S. babylonensis* from Asia. *S. turicatae* however is distinguished from these two species by its feeble infectivity to guineapigs. E H

BRUMPT (E) MAZZOTTI (Luis) & BRUMPT (L C) Etude épidémiologique de la fièvre récurrente endémique des hauts plateaux mexicains. [An Epidemiological Study of Endemic Relapsing Fever of the High Mexican Plateaux.]—*Ann Parasit Humains et Comparés* 1939 July 1 Vol. 17 No 4 pp 275-286 With 4 figs. on 2 plates [38 refs.]

After a useful historical summary of the epidemiology of relapsing fever in America, the authors give the results of the examination of

various lots of *Ornithodoros turicata* collected from various localities of the Mexican plateau during 1938.

Out of 15 lots collected in Irapuato (Guanajuato) Aguascalientes and San Luis Potosi 7 were infected with a spirochaete identified as *Spirochaeta turicatae* the agent of sporadic relapsing fever in the United States.

Numerous *Ornithodoros nicolleti* from rat burrows near Colima, *O. talaje* from Iguala and Huixtla and *O. corrientis* from Tehuantepec were fed on laboratory animals and failed to produce any infection.

E H

DAVIS (Gordon E.) *Ornithodoros parkeri* Distribution and Host Data Spontaneous Infection with Relapsing Fever Spirochaeta.—*Public Health Rep* 1939 July 21 Vol. 54 No 29 pp 1345-1349

The author gives a table showing the known distribution and host data of *Ornithodoros parkeri* based on more than 44 lots collected mainly from rodent burrows in Wyoming Montana, Utah Washington and Colorado.

Six strains of spirochaetes have been recovered from ticks representing three of the collection areas, four strains from the northern part and one from the southern part of Sweetwater County Wyoming, and one from Beaverhead County Montana.

These strains are easily maintained in white mice and white rats and in the latter one strain was carried through 180 passages. In guineapigs they produce a relapsing type of infection with spirochaetes present in the blood during the relapses. In rhesus monkeys they have not yet produced febrile attacks.

No human case of relapsing fever has been reported from Wyoming nor from the part of Colorado where *O. parkeri* has been found, but, in view of the fact that this tick is spontaneously infected with a spirochaete pathogenic in guineapigs, it is open to suspicion as a transmitting agent to man.

E H

DAVIS (Gordon E.) Relapsing Fever the Guinea Pig as an Experimental Animal in the Study of *Ornithodoros turicata* *O. parkeri* and *O. hermsi* Strains of Spirochaeta.—*Public Health Rep* 1939 Sept 22 Vol 54 No 38 pp 1721-1727 With 6 figs

The author has tested the susceptibility of guineapigs to infection with strains of spirochaetes derived from *Ornithodoros turicata* *O. parkeri* and *O. hermsi*.

Ten strains from these 3 species of ticks were used and all 30 test guineapigs became infected either as a result of being bitten by ticks, or the inoculation of infected rat blood. As judged by the microscopical examination of the blood, 7 guineapigs had no relapses, 17 had 1, 4 had 2, 1 had 3 and 1 had 4.

In the case of strains from *O. turicata* more definite results were obtained by tick feeding than by the inoculation of infected blood.

The results suggest that guineapigs would be a useful adjunct to white rats and white mice in the study of relapsing fever spirochaetes occurring in the U S A.

E H

BONÉ (Georges) Contribution à l'étude de la transmission de la fièvre récurrente tropicale. (Premier mémoire) [A Contribution to the Study of the Transmission of Tropical Relapsing Fever]—*Ann Soc Belge de Méd Trop* 1939 Sept 30 Vol 19 No 3 pp 279-334 [44 refs.]

The author gives a useful summary of previous work on the subject followed by details of his own observations on the transmission of *Spirochaeta duttoni* by *Ornithodoros moubata*

The ticks were kept usually at 30°C. after having been fed on mice containing numerous spirochaetes in their blood. With regard to the coxal fluid emitted by the ticks when feeding 4 out of 5 mice injected with it became infected. Moreover actual spirochaetes were found by dark ground examination in 12 out of 15 specimens of the fluid the interval between the infective meal and the examination varying from 7 days to 6 months. With regard to the salivary glands numerous experiments with ticks infected both hereditarily and also by feeding on infected blood gave uniformly negative results as regards their infectivity and the author finds that the usual method of infection when a tick feeds is by the excretion of the coxal fluid containing spirochaetes

The secretions from the Malpighian tubules also failed to produce infection in 25 experiments with ticks 4 days to 4½ months after they had been fed on infected blood

With regard to the evolution of the spirochaetes in the body of the tick the author finds that when ingested the organisms rapidly pass through the wall of the stomach without undergoing any intra-cellular life-cycle and appear in the haemocoel. The quickness with which this is accomplished depends on the degree of distension of the stomach. The spirochaetes multiply in the blood of the tick and generally make their way to the coxal glands where they accumulate in the interior. The numerous short spirochaetes found in the haemocoel are interpreted as the result of the rapid division of the organisms.

The granules present in the Malpighian tubules were found in non infected ticks and are considered to have no connexion with the spirochaetes.

Spirochaetes were also found in eggs laid by infected females, but only in a certain percentage of them and out of 10 mice inoculated with emulsions of eggs ranging from 5 to 100 in each lot only two individuals became infected. It is considered that the spirochaetes in the eggs may have a reduced virulence for mice possibly as a result of being coated with the egg contents. E H

BRETT (G. A.) On the Period of Survival of the Egg, Larva, and First Nymph Stages of the Argasid Tick *Ornithodoros moubata* Murray, at Different Relative Humidities.—*Bull Entom Res* 1939 July Vol 30 Pt 2 pp 247-253 [13 refs.]

The early stages of *Ornithodoros moubata* survive much longer at 25°C (77°F) if the humidity of the air is high. *O. moubata* is absent from the equatorial forests and it has been suggested that this is because the tick thrives best at a low humidity. But in careful laboratory experiments in which eggs larvae and 1st stage nymphs were exposed to a range of humidities from 6.2 per cent. to 80 per cent at 25°C. the mortality was found to be much greater under dry conditions the rise in mortality occurring chiefly between 50 and 30 per

cases studied in the Hospital and School for Tropical Diseases in Calcutta.

During the period 1931 to 1939 878 patients with a history of rat bite attended the out-patient department of the School, and 455 of these developed typical symptoms of rat-bite fever. Out of 191 examined, *Spirillum minus* was isolated from 123 cases from the exudates at the site of the bite. Out of 69 cases examined by animal inoculation 49 gave positive results. The rest were clinically typical cases and all responded to arsenical treatment such as N.A.B. sulpharsenol, solu-salvarsan and sulpharsamine. Out of 128 cases treated with N.A.B. all were cured and some cases which relapsed with sulpharsenol and solu-salvarsan were cured with N.A.B. Out of 174 treated with solu-salvarsan 9 relapsed and the rest were cured. Seventeen cases treated with sulpharsamine were all cured. Two drug resistant cases are recorded.

A chart is given showing the seasonal incidence of these 455 cases, from which it is evident that in Calcutta the disease is most common in the hot weather from May to September. *E Hindle*

GILLEY (Harry M.) & DENNIE (Chas. C.) Rat Bite Fever in Children.—*Southern Med J* 1939 Nov Vol 32 No 11 pp 1109-1111 [12 refs.]

A general account of the disease followed by reports of four typical cases in children seen at the Children's Mercy Hospital, Kansas City Missouri, where since 1924 out of approximately 18,000 patients, there have been only 14 cases of rat bite fever. The cases were treated successfully by seven to ten injections of neocarsphenamine. *E H*

DUBOIS (A.) & PEARSON (Yvonne) Le lieu de persistance des *Spirillum minus* au cours de la stérilisation chimiothérapique. [The Method of Persistence of *Spirillum minus* during the Course of Chemotherapeutic Sterilization.]—*Ann. Soc. Bde de Méd. Trop* 1939 Mar 31 Vol 19 No 1 pp 23-25

Mice infected with *S. minus* were treated with doses of either 914 or stilboan insufficient to cause complete sterilization and 4 or 5 days later the blood and various organs inoculated into other mice to determine which parts of the body still harboured the infection.

The authors treated 45 mice and inoculated their blood and organs into 152 mice of which 67 died too soon for satisfactory observations leaving a total of 85. The results are given in the following table—

Material inoculated	No. of mice inoculated	No. becoming infected
Blood	28	18
Brain	6	2
Lung	11	4
Liver	14	9
Spleen	10	6
Kidneys	8	1
Testes	8	1
Total	85	40

It will be seen that the blood is the most common site of any latent infection (18 out of 28) and the infectivity of the various organs can be explained most reasonably as due to the blood they contain

E H

LOOPUYT (L.) & GISPEN (R.) Een geval van rattebeetziekte (Sodoku) [A Case of Rat Bite Fever]—*Nederl Tijdschr v Geneesk* 1939 July 8. Vol. 83 No. 27 pp 3502-3503 With 1 chart English summary (4 lines)

A man of 24 years reported sick with fever he had a tuberculous family history and this disease was at first suspected. Enquiry revealed that nine weeks earlier he had when at work been bitten on the right knee by a rat. The wound healed in a week and he returned to work but a fortnight later the site of the wound began to swell and became painful. Fever came on in bouts of 2-4 days with intervals free from fever. There was enlargement of the groin glands on the right side. The blood was sent to Professor Schöffner's laboratory and the serum was found to agglutinate the *Spirillum minus* but not *L. sclerochaemorrhagiae* and 0.3 cc. of blood was injected into three white mice which nine days later showed a peritoneal fluid containing Spirilla. H H S

LEPTOSPIROSIS *

PRÉCIS OF ABSTRACTS IN THIS SECTION

DAVIS (p. 207) gives details of the infection of fowl embryos with *L. sclerochaemorrhagiae*.

KORTER (p. 208) isolated *Leptospira* from 4 patients in Sumatra two were new types and were named Djasiman and Sarman.

KASTEIN and HAEX (p. 208) found, in post mortem studies of the central nervous system in Weil's disease that swelling and proliferation of the cells of the vessel walls, with aggregation of leucocytes, cause blockage and disturbance of the circulation in diffusely arranged foci. These changes are not found in other infectious diseases.

TOKUYAMA (p. 209) treated 6 patients with immune serum given intravenously. four recovered. C W

DAVIS (L. J.) The Susceptibility of the Developing Chick Embryo to *Leptospira sclerochaemorrhagiae*.—*Trans Roy Soc Trop Med & Hyg* 1939 July 28 Vol. 33 No. 2. pp 263-266. [Summary appears also in *Bulletin of Hygiene*]

An independent confirmation of the fact that the chorio-allantoic membrane of the developing fowl embryo is susceptible to experimental infection with *Leptospira sclerochaemorrhagiae*. [See this *Bulletin* 1939 Vol. 36 p. 772.]

* Papers concerned with the public health and bacteriological aspects of leptospirosis are reviewed in the *Bulletin of Hygiene*

On the 12th day of incubation 8 eggs were each inoculated with a culture of *Leptospira*, and then incubated at 33°C. The results are summarized in the following table —

Protocol

Day after inoculation when opened	Number of Egg					
	1	2	3	4	5	6
	2nd day	3rd day	4th day	4th day	5th day	5th day
Embryo alive or dead when opened	Alive	Alive	Alive	Recently dead	Alive	Recently dead
<i>Leptospira</i> present in Chorio-allantoic membrane	—	—	+	+	+	+
Allantoic fluid	—	—	++	+	+	—
Heart blood	—	—	+++	+	+++	+
Liver	—	—	++++	+	++++	+
Lungs	—	—	++	+	++	+
Kidneys	—	—	++	+	++	—
Brain	—	—	—	—	+	—
Yolk	—	—	—	—	—	—
Lesions in Chorio-allantoic membrane	Nd	Nd	Hyperplasia	Hyperplasia	Hyperplasia	Hyperplasia
Liver	Nd	Nd	Fatty necrosis	Fatty necrosis	Fatty necrosis	Fatty necrosis

E H

KOTTER (G F) *Leptospirosis in Atjeh. [Leptospirosis in Atjeh.]—Nederl Vrijdsch v Geneesk 1939 July 15 Vol. 63. No. 28 pp 359-3694. English summary (5 lines)*

A series of 4 cases of leptospirosis was met with in Atjeh, Sumatra. Two of these proved to be of the known types Salinem and Rachmat, but the other two were new and are named Djashman and Sermin. The blood or urine of each of the patients was injected intraperitoneally in guinea-pigs and *Leptospira* obtained in pure culture. Serum reactions were very definite in each of the cases and the titres obtained were 1 in 10,000 or over

W F Harvey

KARSTEN (G W) & HAEK (A. J Ch.) *Histopathologische Untersuchungen bei der Spirochaetosis acrohaemorrhagica, mit besonderer Berücksichtigung der Gefäßstörungen. [A Histopathological Study of Spirochaetosis Ictero-haemorrhagica, with Special Reference to the Blockage of Vessels.]—Acta Med Scandinavica 1939 Vol 101 No. 2-3 pp 256-280 With 24 figs. [20 refs.]*

A study of the changes observed in fatal human cases of Weil's disease and various infected guinea-pigs

The authors begin with an account of the changes in the central nervous system, the histological changes in which are distinctly confined to diffusely arranged foci. In these foci various types of

pathologically changed ganglion cells are found among which those showing changes due to local anaemia take the first place. In patients who died of Weil's disease and in cases of experimental infection in guinea-pigs this arrangement can be explained on the assumption that there are foci with disturbed blood supplies. These foci can be demonstrated by means of the Benzidine staining method.

The disturbance of the circulation was found to be due to the blockage of many of the small vessels. These blockages are in turn due to primary swelling and subsequent proliferation of the cells of the vessel walls and to a secondary adhesion or aggregation of leucocytes. In experimental infections similar changes are found. They are absent in other infectious diseases such as poliomyelitis, diphtheria, coccus-encephalitis and also after acute and chronic anuria caused by corrosive sublimate poisoning. E H

TOKUYAMA (Seigo) The Intravenous Serum Treatment of Hemorrhagic Spirochetal Jaundice in Hawaii.—*Mitt d Allgemeinen Path u Path Anat* 1939 Vol. 10 No 1 pp 128-133

A description of the treatment of 6 cases of Weil's disease in Hawaii by the intravenous injection of immune serum. Four of the cases recovered and two died.

A total of 9 cases of the disease were diagnosed clinically and 5 bacteriologically by the isolation of *Leptospira icterohaemorrhagiae*. Out of 3 untreated cases two died, so there is little evidence that the treatment had any effect although the author states that in two cases the injection was followed by a marked general improvement. E H

HELMINTHIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Cestodes—WU (p 210) found *Taenia onchosphaerae* in 0.6 per cent. of 56,286 patients in Peiping.

BARNETT (p 211) points out the errors possible in the diagnosis of hydatid infection and the danger of exploratory puncture and of the use of formalin. He gives general advice as to treatment.

LAWSON (p 212) describes a hydatid of the liver estimated as of 56 years' duration and almost obliterating that organ and BOLOGNESI (p 212) considers that a cyst of the liver ruptured into the stomach. Hydatid cysts in the abdomen, the region of the neck and near the base of the bladder (simulating enlarged prostate) are described by several authors (pp 212-213).

MAPLESTONE and MUKERJI (p 213) regard gentian violet (in hard gelatin capsules) as a valuable drug in the treatment of *H. nana* infestation but more work is needed to determine the most efficient mode of administration. They give the results in 12 cases treated. VERSIANI and RENAULT (p 214) record a case of infestation with *H. diminuta*. DOLLFUS (p 214) reports on *Rallietina* in Ecuador.

TÖTTERDAHN (p. 215) found anaemia in association with *D. latum* infection in a proportion of cases. If pernicious in type it improved rapidly on ironing. VON BOVSDORFF (p. 215) discusses the inhibitory action of extracts of *D. latum* and other worms on the proteolytic activity of fresh normal human gastric juice, and the proteolytic action of *D. latum* on casein. He (p. 216) found that a liver preparation exposed to *D. latum* and other worms did not lose its anti-anaemic action.

JOTTEK *et al* (p. 216) describe native customs in Tonking which lead to ocular sparganosis. Removal of the worm should be left until the tissue reaction has formed a capsule. Reference is made to the success of novarsenobenzol treatment.

Nematodes.—CHANDLER (p. 216) shows that two forms of immunity are developed towards intestinal nematodes: a general parenteral immunity stimulated during parenteral migration of larvae, and a local intestinal immunity towards those which feed on the mucosa. The former is slow of development and only becomes effective after long continued reinfection.

DESCHENS (p. 217) gives instructions for the cultivation of fungi with the object of destroying with their aid the larvae of nematodes in soil.

CHILAROTTI (p. 217) describes a focus of ankylostomiasis in Italy. WIJERAMA (p. 218) discusses ankylostomiasis in Ceylon.

ARMY PASHA and ZANATY (p. 218) discuss the aetiology of hookworm anaemia and show that small blood transfusions are more beneficial after than before iron treatment. McKENZIE (p. 219) finding that the administration of vitamin B₁ rapidly cured the oedema of hookworm anaemia, suggests that this oedema is due to lack of that vitamin through loss of it in the blood extracted by the worms.

SMILLIE (p. 219) advocates the use of hexylresorcinol for hookworm infection, and discusses other drugs. VAN LOOZEN CAMPAGNE (p. 219) notes 4 fatal cases of poisoning with oil of chenopodium and advises that it should only be procurable on medical prescription.

SALDAGOTAD (p. 219) describes the symptoms of creeping eruption due to the larvae of *A. brasiliense* and of a species of *Strongyloides*.

HEYDON and BEARUP (p. 220) report human infection with *T. colubriformis* and BOYKE and LIE KIAN JOE (p. 220) report *T. colubriformis* and another species in man in Java. C 15

WU (Li-shing). *Taenia* Infection. Report based on Stool Examinations of 56,285 Patients in the Peking Union Medical College.—*Chinese Med J* 1939 June Vol 55 No 6 pp 561-565

Presumably the examinations were by smear. *Taenia onchosphaerae* were found in 337 (0.6 per cent) of 56,285 patients. The proportion of *T. solium* to *T. saginata* is put as 1 to 5.6. The labourer class was the most heavily infected, farmers least so while those of high social standing, such as bankers, wealthy merchants, physicians and University professors stood between. Clayton Lane

SWARTZWELDER (J Clyde). Clinical *Taenia* Infection: An Analysis of Sixty Cases.—*J Trop Med & Hyg* 1939 Aug 1 Vol 42 p 15 pp 236-239 With 1 fig

WIOAND (R) Ueber Atropin zur Bandwurmkur Klinischparasitologische Beobachtungen III [Clinical Observations on Atropine in Tape Worm Infections.]—*Deut Med Woch* 1939 June 9 Vol 65 No 23 p 923

FIEMIGER (W) & TEMPEL (D) Zur Bekämpfung der *Taenia saginata* Ein Beispiel für die notwendige Zusammenarbeit von Human und Veterinärmedizin. [On the Control of *T. saginata* An Example of the Need for Collaboration between Human and Veterinary Medicine]—*Deut Med Woch* 1939 Mar 17 Vol 65 No 11 pp 422-423

BARNETT (Louis) Hydatid Disease Errors in Teaching and Practice —*Brit Med J* 1939 Sept 16 pp 593-599 With 14 figs

Errors of a dozen kinds are dealt with. Hydatid mole, hydatid of Morgagni and the oedematous bulbous distensions of the fringes of the choroid plexus which were described by the doctor who performed the autopsy on Sir Walter Scott have nothing to do with Echinococcus infection. Errors in behaviour with dogs result from ignorance of the parasite's life history. The cyst and its constituents are wrongly named. Errors in diagnosis Barnett knows of by the hundred and tells of two of his own. This is one —

The last case I showed I spoke of confidently as a typical instance of fibro-adenoma. There could be no doubt about it. All the signs and symptoms leapt to the eye. There and then I proceeded to operate upon it, and to my embarrassment and to the onlookers' amusement my incision revealed a hydatid cyst.

Traps are lung, bone and brain cysts. In laboratory diagnosis there is in one direction no need to consider an eosinophil of less than 5 per cent and in the other negative Casoni or complement fixation tests mean nothing. Hydatid thrill is extremely rare and a cyst is usually too tense to show fluctuation. Exploratory puncture may spread scolices in the body and if the point of the needle is high in the cyst may fail to deliver them. As to prognosis the slowness of growth and generally good behaviour of most cysts is not sufficiently recognized even if a cyst ruptures and seeds the peritoneal cavity with scolices things are not too bad for Barnett has records of patients operated on twenty times or more and living to an active old age. In treatment the adventitial coat belongs to the host and is nearly always best left to the host's care. Expectant treatment may be the best in a deeply situated lung or calcified liver cyst. A 2 per cent formalin solution run into a cyst will kill scolices but a stronger one in a liver cyst has twice in Barnett's experience killed the patient. Formalin causes hardening and necrosis of the tissues and should not be run into a lung cyst for if there is any leakage into the air passages the trouble may be very serious. It is an error to think of a primary cyst as presumably solitary; they are multiple in quite 25 per cent. of cases. But

It does not follow that because two or more cysts are discovered they should all be operated on at the same sitting. Do not let zeal outstrip discretion. The old wisecrack that I first heard at the Mayo Clinic over thirty years ago is still worth repeating. There are some things worse than a second operation and one of them is a funeral.

Finally the alveolar type of hydatid almost or wholly restricted to the Bavarian Tyrol may be mistaken for cancer; indeed it is itself a malignant type of infection.

LAWSON (Theodore C.) Echinocoerus Cysts of the Liver of Fifty-Six Years Duration.—*Jl Amer Med Assoc.* 1939 Apr 8. Vol. 112. No 14 pp 1331-1333. With 3 figs

The duration of infection here is based on the assumption that the hydatid cysts which were removed from this man of 67 in California were survivals of an infection with which he suffered as a boy of 11

In 1882 an abdominal hydatid cyst was operated upon at St. Bartholomew's Hospital, London. He came to America 2 years later and his appendix was removed in 1933. Since 1928 he had had bouts of pain in the upper lumbar and dorsal region and in front of the abdomen, and treatment for spinal disorder proved ineffective. A pyelogram showed a normal right kidney and palpation a mass in the right upper part of the abdomen. Operation disclosed a large hydatid. It is estimated that about a third of an inch of liver surrounded it and that about a fifth of the liver substance remained. There were 2 masses of cysts and some isolated ones scattered about the peritoneum and the main cyst was opened by separate incision through adhesions to the dome of the liver. A week later signs of hepatic insufficiency began to show warded off by intravenous injections of dextrose in saline. He continued to pass some cysts through the wound for nearly two months. "At present" he is well and comfortable, the operation having taken place in August 1937

C L

BOLOVYER (Giuseppe) Rottura spontanea di una ciste idatidea epatica nello stomaco [A Hydatid Cyst of the Liver Ruptures Spontaneously into the Stomach].—*Riforma Med.* 1939 Apr 15 Vol. 55. No. 15. pp. 559-562, 565. With 2 figs.

A man had suffered from haematemesis at 25 and, it was believed then, had a gastric ulcer. At 55 in the second stool after a dose of castor oil he passed a whitish ovoid mass as big as a small pigeon's egg and looking like a shelled egg—and swooned. No one seems to have seen it but its passer. X-rays showed a rounded mass, irregularly calcified, on the upper and posterior surface of the liver and another on the lesser curvature of the stomach which seemed to give a picture of the organ's cavity. The general subject is considered in various aspects

C L

SHASTRY (T. S.) A Case of Retro-Peritoneal Hydatid Cyst.—*Jl Indian Med Assoc.* 1939. Mar Vol. 8. No. 6. pp. 351-352

A retrovesical hydatid cyst, after producing retention of urine necessitating suprapubic cystotomy burst into the rectum. C L.

CHIFFLET (Abel) Equinococosis preperitoneal. [Preperitoneal Hydatid].—*Arch. Uruguayos de Med., Ciruj. y Especialidades.* 1939 Feb. Vol. 14. No. 2. pp. 177-183. With 8 figs.

A woman, of 38, had suffered 3 abdominal operations for hydatids, the first in the liver, the second in the spleen, while the third abdominal scar was infra-umbilical. A fourth appears to have been through Douglas's pouch. After her death material was sent to Dévé who pointed out that the cysts were peritoneal, not preperitoneal.

C L

LORENZO (Ramon) & BORO (Dalmiro) Quiste hidático de las regiones supra-espinosa y supra-clavicular [Hydatid Cyst of the Supra-Spinous and Supra-Clavicular Regions.]—*Prensa Méd Argentina* 1939 May 3 Vol 26 No 18 pp. 883-887 With 4 figs

After pointing out the rarity in the literature of reports of hydatid cyst of the neck the writers describe an infection in a pregnant woman of 29 There were eosinophilia of 6 per cent an intense Casoni reaction hooklets in the fluid obtained from the cyst on puncture and an X ray shadow C L

LEWIS (J Trevor) Hydatid Cyst simulating Enlargement of the Prostate Gland. [Memoranda.]—*Brit Med J* 1939 Aug 26 p 448

This infection occurred in a roadman in Denbighshire A cyst the size of a large orange and with partly calcified walls pushed the base of the bladder forwards. When this organ was opened suprapubically the cyst burst expelling daughter cysts. Recovery has been good apart from occasional attacks of cystitis C L

SPEZIALE (Vittorio) & BERGER (Renato) Echinococcosi polistica secondaria locale del polmone [Secondary Hydatid of the Lung]—*Riforma Med* 1939 May 20 Vol. 55 No 20 pp 759-764 With 3 figs.

PARDAL (Ramon) Hidatidosis múltiple del encéfalo Conos de presión y pousées de edema en la determinación de síndromes sucesivos diferentes. [Multiple Hydatid of the Brain.]—*Prensa Méd Argentina* 1939 May 17 Vol. 26 No 20 pp 665-673 With 5 figs. [29 refs.]

MAPLESTONE (P A) & MUKERJI (A. K) Eradication of *Hymenolepis nana* Infection.—*Indian Med Gaz* 1939 Apr Vol. 74 No 4 pp. 195-198.

These observations indicate that gentian violet is a valuable drug for treatment of *H. nana* infection possibly the only one of any real value Much more work is needed to decide whether a course of treatment for a week or longer or several courses of three days duration at weekly intervals will prove to be the best The interrupted form of treatment instead of a continuous course of six or seven days was tried on some of our cases in an effort to avoid the nausea and vomiting which is fairly common with this drug "

The gentian violet was always given in hard gelatin capsules and the absence of eggs was determined by D.C.F The lines of treatment are based on the work of SHORR [this *Bulletin* 1934 Vol. 31 p 117] [who found that in mice the prepatent period varied from 11 to 16 and the period of egg production from 1 to 11 days] and of HUNNINEN [this *Bulletin* 1936 Vol. 33 p 99] [who found long periods of absence of eggs from the stools] Taking these last into view the authors feel that until more is known an interval of a month or even longer till knowledge is more exact should be allowed to pass before the absence of infection can be concluded. The authors treated twelve infections

with an adult dose of 1 gram three times a day, for varying periods according to circumstances.

Case 1 treated for 3 days eggs disappeared on the sixth day period of observation 8 days Case 2, treated for 6 days and also given oil of chenopodium and tetrachlorethylene for hookworm, Ascaris and Strongyloides *H. nana* eggs disappeared period of observation seems to have been 2 days after treatment ceased Case 3, treated twice with santoun and oil of chenopodium for Ascaris *H. nana* eggs then being found for the first time gentian violet was given for a day stopped because of vomiting, resumed after 2 days and abandoned on account of the recurrence of vomiting period of further observation 4 days during which no eggs of *H. nana* were found Case 4 gentian violet stopped after 4 days on account of vomiting further observation for 3 days during which no eggs were found Case 5, gentian violet 5 courses given because eggs reappeared four times, none was found three months after the last course. Case 6 two courses of treatment did not answer. Case 7 treatment stopped on fifth day on account of vomiting, and on that day eggs disappeared and were not seen again during 23 days of observation. Case 8, treatment interrupted by vomiting, one egg seen a month after treatment ceased and none during the next month Case 9 three four-day courses with three-day intervals had no apparent effect. Case 10 three three-day courses, eggs appearing on the second day of the last course, but no more before discharge 9 days later Case 11 three courses and still positive a month after the last. Case 12, positive 23 days after treatment ceased

C. L.

VERSIANI (Waldemar) & RENAUZT (Léon) Parasitismo humano pela *Hymenolepis diminuta* (Rudolphi, 1819) (Human Infection with *H. diminuta* — Brazil-Paraná, 1939 Apr 15 Vol. 53. No 16 pp 453-454 With 1 fig)

A child of 6 was passing in the faeces *Giardia lamblia* and eggs of Ascaris, Enterobius and *H. diminuta*. Oil of chenopodium brought away thread worms and a headless *H. diminuta*. It seems to have been 40 days later that eggs of the tapeworm reappeared. A second dose of the vermifuge brought away once more a headless strobile but there was no recurrence

C. L.

CLAPHAM (Phyllis A.) Some Polyradial Specimens of *Taraxia pariformis* and *Dipylidium cerinum* with a Bibliography of the Abnormalities Occurring among Cestodes.—*Jl Helminthology* 1939 Aug Vol. 17 No 3 pp 163-176 With 2 figs 129 refs.]

DOLLfus (Robert) Cestodes du genre *Raillietina* récemment observés chez l'homme en Equateur [*Raillietina* in Man in Ecuador]—*Bull Soc Path Exot* 1939 June 14 Vol. 32 No. 6 pp. 660-665

Specimens of *Raillietina* passed by man in Ecuador were sent to BERNHART by Luis A. León and are divided by Dollfus into 5 species, of which a fuller description will be given later. Their names are *R. (Raillietina) guineensis* Luis A. León, 1935 *R. (R.) insulorum* n. sp., *R. (R.) brevifilis* n. sp. *R. (R.) equatoriensis* n. sp., *R. (Falkenmeyerella) leoni* n. sp.

C. L.

TÖTTERMAN (Gundo) Ueber Sternalmark und Blut bei Wurmträgern (*Bothriocephalus latus* *Taenia mediocanellata*) [Sternal Marrow and Blood in those Infected with *D. latum* and *T. saginata*].—*Acta Med Scandinavica* 1939 Supplement 104 176 pp [123 refs.]

In those harbouring *D. latum* erythropoiesis in the marrow is with normoblasts and a slight tendency to the left in the nuclear index of neutrophils points in the same direction though these are only average conditions. When anaemia is hypochromic the number of normoblasts is as usual not raised. On the average eosinophils are little increased. But when there is anaemia of the pernicious type the marrow has the corresponding character an increased erythropoiesis with more megaloblasts and promegaloblasts. In the blood of those harbouring this parasite the average diameter of red cells is slightly increased, there is an increase in eosinophils and some tendency to leucopenia. In 14.8 per cent of cases there was slight anaemia caused perhaps by the infection but it was very rarely of the pernicious type and the achylia in these slight cases was no greater than in the infected without anaemia. In 7 patients in whom the colour index was lowered there was no improvement after unworming. In many there was bile pigment in the urine suggesting liver damage. When anaemia was of the pernicious type it improved rapidly on unworming.

In *Taenia* patients there was marked eosinophilia in marrow and blood but erythropoiesis was uninfluenced. As to whether the infection causes anaemia the number of cases seen, nearly all women were too few for safe conclusions to be drawn. C. L.

VON BONSORFF (Bertel) The Influence of Intestinal Worms on the Proteolytic Activity In Vitro of Trypsin, Papain and Pepsin and Especially of Human Gastric Juice at Neutral Reaction. *Diphyllobothrium latum* and Pernicious Anemia. II.—*Acta Med Scandinavica* 1939 Vol. 100 No 3-5 pp 459-482. With 7 figs [10 refs.]

Aqueous extracts of fresh and dried *Diphyllobothrium latum* and *Taenia saginata* and of fresh *Ascaris lumbricoides* exercise a marked inhibiting influence upon the proteolytic activity of normal human gastric juice (on casein) at a reaction in the vicinity of the neutral point. The same substances do not inhibit the action of trypsin, papain, and pepsin and of gastric juice at strong acid reaction on the contrary the hydrolysis expressed in increase in nitrogen in the trichloroacetic acid filtrates is more marked in the digests containing worm emulsion. The worm proteins are quickly digested by trypsin, papain and pepsin, but not by gastric juice at pH 7.4. The addition of a broth culture of *B. coli* does not noticeably influence the proteolytic effect either of trypsin or pepsin, or of gastric juice, at neutral reaction. *Diphyllobothrium latum* has considerable proteolytic effect on casein. The maximum digestion is with pH 4 with a lower pH the digestion decreases quickly with a higher pH more slowly a moderate digestion still occurs with neutral and slightly alkaline reaction. Within the range of this acidity there is an auto-digestion of the worm. The enzymatic activity of *Taenia saginata* and *Ascaris lumbricoides* is less. The worm enzyme is possibly identical with cathepsin.

C. L.

mixed blood slide. Excess of stain is taken up with blotting paper. Solutions of 1 in 1,000 and 1 in 2,000 can also be used. The slides may be examined immediately—cells and parasites are clearly coloured and Schüffner's dots show distinctly.

For thick drop preparations 4 drops of 1 per cent. eosin and 8 of 1 per cent. methylene blue are added to 20 cc. of distilled water and the mixture is stirred with the slide carrying the thick drop. In 15 minutes it is haemolysed and stained.

In the absence of all trace of alcohol the precipitate caused by the mixture of eosin and methylene blue forms very slowly.

Alcoholic solutions can be used, consisting of—

A	Methylene blue	0.6 gm.
	<i>Bleu d'argent</i>	0.4 gm.
	Methyl alcohol	50 cc.
B	Eosin	0.5 gm.
	Methyl alcohol	50 cc.

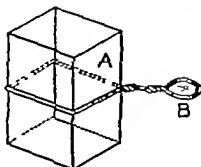
[*Bleu d'argent* is probably Borrel's blue with silver oxide.]

One drop of A and of B is mixed in 3 cc. distilled water. For staining without fixation 0.3 cc. of each is added to 3 cc. distilled water and used as described above. For thick drop preparations 7 drops of A and 7 of B are mixed in 20 cc. distilled water and the slide left immersed for 20 minutes.

These procedures are quick and simple and the stains stable even in hot countries if protected from light. C IV

WILLIAMS (Carroll M.) A Method for studying Living Mosquito Larvae and Other Small Aquatic Invertebrates.—*Science* 1909 July 7 N.S. Vol. 90 No. 2323 pp 21-23. With 1 fig.

One end of a piece of thin copper wire is twisted into a circle of $\frac{1}{2}$ inch diameter the other end round a square block of lead which forms a stable support. The wire circle is dipped into water and the larva or other small aquatic animal is introduced into the film retained in the circle, which can then be placed in focus under a microscope for study. By this method there is ample air supply and no interference with the normal habits such as may occur under a cover slip or in a preparation treated with drugs. The figure explains the method.



Device for studying small, living, aquatic animals. A lead block
B wire loop with inclosed film of water

[Reproduced from *Science*.]

GIOMO (Gino) Lo stato attuale delle conoscenze sull'ulcera tropicale [The Present State of Knowledge of Tropical Ulcer]—*Arch Ital Sci Med Colon e Parassit* 1939 Sept Vol 20 No 9 pp. 536-566. With 4 figs & 1 map

This is a long discussion of theories advanced to explain the aetiology of tropical ulcer which are not new to readers of this *Bulletin*. The author accepts the view that vitamin deficiency plays an important part together with the effects of warm humid climate and the debility caused by many diseases of the tropics. Spirochaetes and fusiform bacilli are concerned in the aetiology. He describes the clinical appearances illustrating his paper with good photographs and gives details of various treatments.

In prevention he urges improvement in nutrition treatment of other debilitating diseases prompt attention to trivial injuries protection of legs and feet and the treatment of cases to prevent contagion.

C IV

TODD (H. W.) A Treatment for Phagedaena (Tropical Ulcer)—*Brit Med J* 1939 Sept 30 pp 687-688

The author has used this treatment almost exclusively for a dozen years. It consists of applying a freshly prepared saturated solution of potassium permanganate on cotton wool to the sloughing floor of the ulcer. Small sloughs seem to be burnt away and large sloughs are freed as much as possible and cut away with scissors though a warning is given against cutting tissue which bleeds. Removal of dead skin often reveals further areas. The application is continued until the patient experiences the sensation of burning and the ulcer which has a tarred appearance is then filled with 1 in 5 iodoform boric dusting powder covered with wool and bandaged. On the third day remaining sloughing spots are similarly treated. Few ulcers require a third application.

Even in anaesthetic leprosy ulcers the treatment can be used with great success for it appears that permanganate does not kill living tissues and its action is presumably against anaerobes. The treatment is known as PPC—potassium permanganate cautery. It was first quoted to the author from an unknown source by a non-medical colleague.

C IV

BERGER (R. M. Renato) La simpaticectomia periaortica nel trattamento delle ulcere tropicali [Arterial Sympathectomy in the Treatment of Tropical Ulcer]—*Ann di Med Nov e Colon* 1939 Jan.-Feb. Vol 45 No 1-2. pp 31-36

HAMBURGER (H. J.) Observation on the Pathology and Therapy of the So-called Frontier Sore.—*Indian Med. Gaz* 1939 Mar Vol. 74 No 3 pp. 151-155 With 1 graph

Frontier sore is to be regarded as a clinical entity but the aetiological agents are diverse. In 83 examined leishmania were found in 11 *C. diphtheriae* in 3 staphylococci in 53 and streptococci in 5. The appearances of the sores are not uniform but chronicity and resistance

KRÖBER (Friedrich) Ueber ein eigenartiges Krankheitsbild bei afrikanischen Eingeborenen am Westufer des Viktoria-Seea. Nachtrag zu meiner Arbeit im Band 37 1933 S 484 ds. Zeitschr. [A Peculiar Illness in African Natives on the West Shore of Victoria Nyanza.]—*Arch f Schiffs u Trop Hyg* 1939 Apr Vol. 43 No 4 pp 160-167 With 4 figs [Summary appears also in *Bulletin of Hygiene*]

Kröber refers first to a previous report in which he described a peculiar uro-genital condition often seen in the natives of the West shore of Victoria Nyanza. It affects chiefly men in whom starting with a urethritis, there develop abscesses in the neighbourhood of the urethra on the scrotum on the perineum, the gluteal region and hypogastrium and the condition may lead to narrowing and complete displacement of the urethra. urinary fistulae may form on the parts mentioned. On the outer openings of these fistulae may develop nodules and many bossed tumours which can reach the size of a man's head or larger. The whole genital area is often irregular thickened and deformed. The urinary infection commonly leads to uraemia and death. The author has come to the conclusion that the condition is not due to Bilharzia, which is not endemic in his area but either to gonococcal infection or to mixed infection following this. He gives no evidence of gonococci having been found in these cases but states that gonorrhoea is widespread in the Colony and as evidence of mal-treatment of such cases he mentions having seen a kind of straw stalk used for evacuating the bladder and to implant infusions into the urethra. Some use a long stick which they introduce into the urethra to encourage urination. Such treatment causes abscesses, and opening of these with impure instruments, probing of fistulae with thin sticks smeared with medicaments and such like unsuitable treatment lead in the author's opinion eventually to the conditions mentioned above. In women he very rarely saw early gonorrhoea but much salpingitis. This and azoospermia of men which is often found there, are attributed to gonorrhoea. As further evidence of the wide spread of gonorrhoea he found many children with bacteriologically proven gonococcal infection of the genitals which he attributed to unhygienic habits. Gonococcal vulvo-vaginitis of children of white people and Indians is common and is attributed to infection by native nursemaids. It has been the subject of earnest conferences in Kenya. Gonococcal ophthalmia of new-born infants and small children is also relatively common. Colonists, either white or brown often contract gonorrhoea from native women, and the author has not infrequently seen in them the formation of abscesses, strictures, fistulae and cystitis with bacterial flora similar to those in the condition first mentioned. he has not, however seen any tumour formation in the colonists. As further evidence of the wide spread of gonorrhoea he instances one-child and total sterility. He refers to the importance of these factors to the population problem and the desirability of further investigation. In this connexion he mentions the interest for Germans in view of the possibility, that the German colonies will be restored to the Reich.

As regards the possibility of the condition being due to infection with the virus of L.1. he mentions that Frei tests instituted on the recommendation of RUGE were negative in male cases with fully developed tumours, fistulae etc. as described above but positive in women with ulcers and fistulae on the genitals. He concludes from this

and histological evidence that the genital ulceration and rectal stricture formation in women is due to the virus of L.i but he does not think the men's fistulae ulcers and tumours are due to this cause. In spite of proof that women harbour L.i virus he does not mention having seen L.i in men. He says however that formerly he suspected that the condition first described might be due to L.i but he abandoned the idea not having seen any typical buboes.

L W Harrison

FICI (Vincenzo) La broncospirochetosi del Castellani in Sicilia. Note pratiche [Bronchial Spirochaetosis in Sicily]—*Policlinico Sez. Med.* 1939 Apr 1 Vol 48 No 4 pp 215-232. [28 refs.]

A long article of the nature of text-book description of the condition first noted by CASTELLANI in 1905 the clinical symptoms associated therewith the X ray findings and the diagnosis. The author states that since 1934 he has seen forty cases of which 37 were in patients living in Sicily these were distributed mainly in the western part of the island more in males but at all ages except the very young. He has not observed any familial or contact extension and all were chronic in course. He divides them clinically into four groups (1) Insidious onset (subdole) with vague signs and difficult to diagnose (2) Bronchitic, with catarrhal or purulent expectoration (3) Pseudotuberculous (4) Asthmatic, with emphysema as a complication in some. Very rarely was tuberculosis also present (whether he means that tuberculosis is rare in these patients or these rarely became tuberculous is not clear to the reviewer but this is a point which can hardly be decided on a total of 40 cases seen in 5 years) H H S

MEDULLA (Candido) La broncospirochetosi del Castellani in Cirenaica. [Bronchospirochaetosis of Castellani in Cirenaica.]—*Arch Ital Sci Med Colon e Parassiti* 1939 July Vol. 20 No 7 pp 408-435 With 14 figs.

The author after a discussion of previously reported work describes 6 cases seen in N. African natives. All had haemoptysis but sputum was negative for tubercle bacilli and tuberculin tests were also negative. X ray examinations revealed pulmonary lesions not typical of tuberculosis or accentuated hilar shadows. In the sputum of all were found spirochaetes sometimes with fusiform bacilli but no organisms of the type of amoebae mycotic fungi or ova of *Paragonimus*. Syphilis was excluded by negative Wassermann Kahn and Meinicke reactions. The spirochaetes varied in length from 6.6 to 18.5 μ and the irregular spirals varied between 2 and 5 in number.

The cases were sporadic without apparent connexion with others and were observed in 1935 and 1936. Five were successfully treated with intravenous or intramuscular Neomacol (an arsenic preparation) the sixth was given tartar emetic *per os* and bismuth injections.

C H

SILVA-CORREA (Miguel R.) Dos casos de esporotricosis en Cerro Largo. [Two Cases of Sporotrichosis in Cerro Largo, Uruguay]—*Arch Uruguayos de Med Cirug y Especialidades* 1938 Dec. Vol. 13 No 8 pp. 697-700 With 2 figs.

The two cases here described were very similar except that one was more acute and the patient gave a more definite history. This

was a man of 28 years who stated that he had noticed a small lump on his left hand for 3 months. He attributed it to the bite of an insect. All sorts of local treatment, fomentation ointment anti-anthrax serum had been tried without success and the swelling broke and discharged a white purulent-looking viscid secretion. From this the author cultivated *Sporotrichum beeruani*. Iodide treatment locally and internally brought about a cure in a little over a fortnight.

The other patient had suffered with temporary improvements for a year and showed a chronic ulcer of the right hand with a sticky whitish exudate. There were small gummata round the ulcer and five scars along the lymphatics indicative of healed ulcers. In this case also the *Sporothrix* was grown and similar treatment resulted in cure in just under three weeks.

The author is of opinion that these cases are more common than is generally believed and that an erroneous diagnosis of syphilitic gumma or of anthrax masks some of them and stresses the point that in all such cases of chronic nodules or ulcer sporotrichosis should be borne in mind and examination made for the fungus. H H S

DRUMMOND (Maurice) A Case of Unusual Skin Disease—*Irish Jl Med Sci* 1939 Feb p 85 With 2 figs on 1 plate

The patient was a female deaf mute aged 19 and the condition resembled ambum. Several fingers of both hands were completely encircled by tightly constricting bands of fibrous tissue. Hyperkeratosis of the palms was present and soft wart like formations were found over the knuckles and in front of the knees. There was hyperkeratosis of the soles but no constriction of the toes. Ulceration of one finger occurred but there was no X ray evidence of bone absorption.

C W

BASSO (Redento) Investigaciones sobre dipteros Argentinos. I. Miasis e Frecuencia y naturaleza de las miasis en Mendoza. [Myiasis in Mendoza, Argentina].—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy)* 1939 Publicacion No 41 pp 55-65 With 5 figs. & 3 graphs

Between 1920 and 1935 there have been registered as attending at the city hospital Mendoza, 197 cases of myiasis. Nine of these were re-infected the same year, twenty in some other year than that of first entry and one 14 years later. The site affected has been noted in 130 cases: the nasal orifices were invaded in 64.5 per cent, wounds or ulcers of the leg in 10.4, the scalp in 8.3, the ear in 5.2, vulva in 4.7, anal margin in 3.1. As regards age, nearly 20 per cent. were between 30 and 40 years and 17 per cent. between 40 and 50, the majority being between 30 and 46 years. Most of them were day labourers and field workers whose personal hygiene leaves much to be desired, who suffer from wounds and ulcers, and many of them from ozaena and who indulge unduly in alcohol. Most are attacked in February (26 per cent.) next in January (22 per cent.) and March (21 per cent.). Brief details are given of eleven patients, and a table shows the number

year by year the localization of the infection the sex age profession and the time in hospital The flies attacking were *Cochliomyia hominivorax* and *Sarcophaga barbata*
H H S

MAZZA (Salvador) & CORNEJO (Andres) Investigaciones sobre dipteros Argentinos I Miiasis y Consideraciones sobre miiasis observadas en la provincia de Salta [Cases of Myiasis observed in Salta Province, Argentine]—Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) 1939 Publicación No 41 pp 78-88 With 12 figs

In Salta Province myiasis is not often met with in the ten years 1928-38 inclusive only 44 have been seen in the hospital. As in the case of Mendoza Province nasal cases were the most common 11 out of 21 in whom the localization was noted next came the ear the head and the ano-scrotal region It is an affection of spring and summer almost exclusively Of the 44 cases eleven occurred in December eight in January nine in February and six in November As regards age 15 were between 20 and 40 years, 13 between 40 and 60 and ten were over 60 years In nearly all the offending fly was *Cochliomyia hominivorax* Brief details are given of nine patients the illustrations depicting the condition of some of these are horribly realistic
H H S

MURRAY (N L) The Causal Organism of South African 'Sandworm' Eruption. A Preliminary Note—*Brit Med J* 1939 May 20 pp 1026-1027 With 1 text fig & 6 figs on 1 special plate

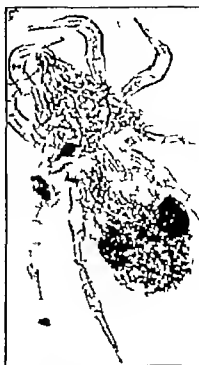
The author describes a skin disease creeping eruption which he attributes to the action of an unnamed mite (Acarina)

A condition known as creeping eruption or sandworm is common in Natal and Zululand especially on the coast Patients exhibit a thin tortuous line of inflammation which is raised above the surface of the skin and geoeally occurs in those parts which come in contact with the ground Excellent photographs show that the condition resembles the creeping eruption of other countries due in some cases to larval nematodes in others to larvae of Oestrid flies of species which do not normally attack man The author has made a careful examination of the burrows in living subjects and has excised pieces and cut sections of them Though he has examined 30 burrows he has failed to find either the nematodes or the Oestrid but he has found some undetermined mites which he regards as the cause of the condition It is stated that A number of slides were prepared from droplets taken from various portions of the tracks in the skin examination of these revealed a mite

[Few medical men realize the great numbers and variety of mites which occur in many situations for instance in soil and moss in certain growing plants and in groceries, cellars and the premises of corn merchants. Mites may be extremely common on the skin of people who work in a variety of places but they are minute and they pass unnoticed, except when some careful person like the present author has to examine a human patient very thoroughly It appears possible that in the present cases the mites are accidental in favour of this view one observes that apparently 2 or 3 sorts were found which



Case I. Adult European male affected with "sandworms". Ten days duration. Note the tortuous track in skin over crest of thigh. Each of the other patches represents a track which has been scratched to relieve the intense irritation.



Case II. Adult female mite (subventral view). Obtained from the hand.

[Reproduced from the *British Medical Journal*]

the author regards as developmental stages of the same mite. If, however, it can be substantiated that mites cause this condition, then the observations are extremely interesting.]

P. A. Buxton

Scabies. Notes on a New Method of Treatment. Bwelo. Inzila. Impya Ya Ku Sihka. 1 p. leaflet. No place or date of publication. Anonymous.

We understand that the treatment for scabies which is described in the leaflet has been in use in Northern Rhodesia for some time and that it gives good results in the hands of unskilled personnel. The leaflet is in parallel columns, English and several African languages.

To make the solution, one puts 3 lbs. of slaked lime and 3 lbs. of sulphur in a 4 gallon petrol tin and fills it with water. This is boiled and stirred. The sediment is discarded and the clear liquid is painted on the patient with a mop after thorough bathing and soaping. The liquid must be kept from the eyes, and should be rubbed into the skin. The patient's clothes must be washed with soap and water. The treatment is repeated daily for five days. [See also *Bull. of Hyg.*, 1939 Vol. 14 pp. 564-513.]

P. A. Buxton

RICKLIN (J) *Fièvres typhoïde et paratyphoïde et N'Zadi* [Enteric Fever and N'Zadi]—*Ann Soc Belge de Méd Trop* 1938 Dec 31 Vol. 18. No 4 pp 629-637

In 1928 an outbreak of disease occurred among workers at Tshikapa (Belgian Congo) it was designated locally as N'Zadi. Helminthiasis is common among them and the disease was at first ascribed to this but it is difficult to visualize an epidemic outbreak of an habitual helminthiasis. There were several fatal cases and a state of panic arose. The symptoms were debility, fever, rapid loss of weight, diarrhoea (rarely constipation) with relaxation of sphincter and local anal ulceration. Diagnoses made were bacillary dysentery, schistosomiasis, avitaminosis. Blood examination gave agglutination of *Bad typhosium* in some of the cases. One hundred and three admitted to hospital showed clear signs of enteric fever. The temperature rose to 39-40 C fairly quickly and stayed at that level for a fortnight or so but some presented oscillations of temperature. Twenty-seven had bronchitic cough at the onset but physical signs in the lungs were very slight. There was abdominal pain more marked in the right iliac region with gurgling. Vomiting was fairly common, the tongue was furred with red tip and sides. Convalescence was prolonged and sometimes a general adenitis was observed which did not clear up for 2-3 months. Rashes were occasionally seen—small spots on flanks and chest [their character is not described]. Six autopsies were carried out, four showed ulceration of Peyer's patches, two a certain degree of intestinal inflammation. The fatality rate was 11 per cent.

In the discussion it was agreed that use of the term *n zadi* should be discouraged. It probably included several conditions. Enteric fever was certainly one, and the outbreak referred to died down after anti-enteric vaccination was adopted, but the natives apply it also to any debilitating disease with wasting. Some with tuberculosis (sputum positive) say that they are suffering from *n zadi*. Whether the syndrome of diarrhoea and anal ulceration is due to an avitaminosis has not yet been determined. H H S

GACETA MEDICA DE CARACAS. 1939 Jan 31 Vol 46 No 2. pp 25-31—La fiebre fría de Lara. [Lara Fever] Que es la fiebre fría en Lara? [IZQUIERDO (Francisco)] La verdad sobre la fiebre fría en Lara [ANZOLA FALCÓN (Francisco)] La fiebre fría de Enero [GONZÁLEZ RINCONES (Rafael)] La epidemia en Barquisimeto. Última hora. El paludismo en Barquisimeto.

Lara fever or the febrile chills (fiebre fría) of Lara form the subject of a leading article and several communications in this issue. Among them is an account of an outbreak at Barquisimeto, Venezuela. So far as investigations have proceeded at present the condition is not separable from subtertian malaria (algid form) the parasites being found in all typical cases. H H S

MCCAMMON (Walter O) *Sulfanilamide in the Treatment of Smallpox*.—*Jl Amer Med Assoc* 1939 May 13 Vol 112. No 19 pp 1936-1937

The author treated 7 patients with smallpox, 6 being members of one family during an outbreak in Kentucky. The initial symptoms

were the same in all and with the appearance of the rash were typical of that disease. Three were given symptomatic treatment and the disease progressed in the usual way. Four were given sulphanilamide which apparently prevented the macular eruption from becoming pustular except in one patient who developed three pustules. These patients were fit to work a week earlier than the others. The author considers that the beneficial effect of sulphanilamide was not coincidental and that it acts by aborting the second phase of pustulation and scarring. C II

SCHULMANN (Werner) Problems and Progress in Chemotherapy—*Ann Trop Med & Parasit* 1939 July 20 Vol 33 No. 2 pp 171-193 (82 refs.)

IRISAWA (T) Vergleichender Ueberblick ueber die Häufigkeit der in Japan und in Europa auftretenden Krankheiten [Comparative Survey of Diseases occurring in Japan and in Europe.]—*Arch f Schiff u Trop Hyg* 1939 June Vol 43 No 6 pp. 245-256

DE (M V) & TRIBEDI (B P) The Pathogenesis of the Commoner Types of Splenomegaly met with in India.—*Indian Med Gaz* 1939 Jan Vol 74 No 1 pp 9-14 With 4 plates (1 coloured) [23 refs.]

The paper discusses the pathology of three types of splenomegaly which occur commonly in India—malarial, kishmanian and Bengal splenomegaly—and it is pointed out that the last named does not differ from the others as regards the morbid changes which show that the same factors are at work in all three in the pathogenesis of the enlargement. In the case of Bengal splenomegaly there is this difference namely that the infective agent is not known, though it is safe to conclude that a virus of low grade virulence is at work. A coloured plate illustrates the appearance of the cut spleen in the three conditions, while a series of microphotographs shows the main histological features. C V Weyon.

SHAN (S. R. A.) A Note on Some Cases of Lathyrism in a Punjab Village.—*Indian Med Gaz* 1939 July Vol. 74 No. 7 pp 385-388 With 2 figs.

INDIAN MEDICAL GAZETTE 1939 July Vol 74 No 7 pp. 421-422.—Lathyrism. [Summary appears also in *Bulletin of Hygiene*]

This outbreak started in June 1935 and in four months 64 out of a population of 205 had been attacked. In 34 there were early gastrointestinal symptoms—nausea vomiting, diarrhoea—for several days before the parietic signs appeared. In the other 30 the onset was sudden coming on during the night. The chief nerve symptoms were tingling in the soles, analgesia, anaesthesia and formication then the signs of spastic diplegia passing in a month or so to the parietic. Reflexes exaggerated in the early stages were diminished to absence later. Sphincters were not affected. The differences from beriberi, pellagra and ergotism were easily made out.

Investigation was hampered by the fact that *Lathyrus sativus* is not grown nor used in the district attacked. It was noticed, however, that whenever the patients ate wheat *chapattis* their progress was retarded, and further enquiry discovered that these had been made

with old stocks of wheat. No such result followed the use of fresh stocks. The old stocks were then found to be contaminated with seeds of *Liccia sativa* (akta). Avitaminosis it was thought might play some part but the food has been the same for years and it was only after the wheat contaminated with *Liccia sativa* seeds began to be used that these cases began to appear. H H S

BYRON (F. E.) Fatal Results following the Administration of Magnesium Sulphate.—*Jl Malaya Branch Brit Med Assoc* 1939 June Vol 3 No 1 pp 100-101

Brief notes are given of five Tamil children ages ranging between 2½ and 10 years who died in 10 minutes to 1½ hours after they had been given magnesium sulphate. One aged 2½ years had had 6 drachms of 50 per cent magnesium sulphate in water the others had had it in the form of *Misti alba* in a dose of 1½ oz (a child of 10 years) and 1 oz of *Misti alba fortis* (a child of 9 years). Intravenously administered magnesium salts are known to cause coma and death but from the intestine absorption is slow as a rule. The above cases show that it may be rapid and if concentrated fatal. Normal blood serum contains 2-3 mgm per 100 cc but in the case of the first child mentioned above 8 mgm were present. The dose for adults according to the B.P. is ½-1 ounce but not infrequently three times this is given. The histories detailed show the need for caution in using this preparation for children in the doses often employed. *Misti alba* is not for children at least a harmless aperient to be given in almost *ad lib* doses. Two of the children had had a small dose of oil of chenopodium but this played no part as the other three had had none. H H S

TRAGER (William) Acquired Immunity to Ticks.—*Jl Parasitology* 1939 Feb Vol 25 No 1 pp 57-81 With 3 plates. [35 refs.]

Animals on which ticks have fed acquire a resistance or immunity to further bites from ticks.

If one puts larvae of the tick *Dermacentor variabilis* on a guineapig not previously used they readily gorge. If one repeats this with the same individual host few or none succeed in gorging though they attach themselves and start to feed. One experiment (no 42) may be quoted out of many which are carefully recorded. One hundred larvae of this tick were put on each ear of a guineapig. 65 and 57 gorged themselves on the two ears. Four other guineapigs were used at the same time the percentage of larvae engorging being from 0 to 5. These 4 hosts had this in common that ticks had been fed on them not necessarily very many or shortly before the experiment was made.

It is not only larval ticks that fail to feed on guineapigs used previously ticks of all stages may fail or may take much less than the normal amount of blood, therefore growing less. Moreover the phenomenon is not specific to *D. variabilis* for any one of several ticks rendered it difficult for later batches (of the same or other species) to feed fully. The immunization of the host was observed in rabbits and guineapigs also in deer mice (*Peromyscus*) a natural host of this tick.

The increased resistance to the tick was partly local (e.g. in one ear of the host) and partly general. The view is put forward that an

antibody is developed which circulates, and accelerates local reaction. The resistance to tick bite develops within 2 weeks, and may endure at least 3 months. Extract of ticks produces an immunity, local and general. Some of this power of resistance to tick may be transferred to a fresh host by transfer of serum.

The paper is illustrated with microphotographs of sections of ears of animals on which ticks are fed. If the animal has not previously been attacked, the mouth-parts of the tick cut through the epidermis, and may be seen reaching the dermis. There may be a small local haemorrhage, but there is no inflammatory reaction. If however the host has been used before a large inflammatory mass containing polymorphs collects by the fourth day, moreover the epithelium at the edge of the bite grows down beneath this mass which is thus isolated, so that the tick cannot reach blood-vessels and eventually drops off without completing its feed. The author reasonably supposes that it is the tick's saliva which acts as an antigen and produces this result.

In the discussion it is pointed out that tick paralysis is apparently commoner in young than mature animals, perhaps because the young have not acquired a resistance to the bite. P. A. BURTON

PAULIE (Cornelius B.) Ticks as Vectors of Animal Diseases.—Reprinted from *Canadian Entomologist* 1939 Mar. pp. 55-65

ROSTRI (C.) Gli Insetti dello Scio e del Gumma. The Insects of Scio and Gumma.—*Riv di Biol Colon* Rome 1939 June Vol 2 No. 3. pp. 185-192. With 2 figs. 10 refs. English summary (3 lines)

ZUMER (F.) Was wissen wir ueber die hygienische Bedeutung der Stomoxynidae? [The Importance of Stomoxynidae in Human and Veterinary Medicine.—*Ztschr f Hyg u Infektionskr* 1939 July 10 Vol 121 No. 6 pp. 679-731. With 5 figs. [5 pages of refs.]

This is an exhaustive review of the part played particularly by Stomoxys in the transmission of disease in man and animals. It is accompanied by an extensive bibliography. The mouth-parts of Stomoxys are described and it is pointed out that transmission of pathogenic organisms can take place only if they are present in the saliva or if the tip of the proboscis is contaminated by them. Apart from this a previous infective meal is no source of danger. Now none of the organisms affecting man with which Stomoxys has been thought to be concerned goes through a developmental cycle so the fly infection is only possible through mechanical transmission by contamination of the proboscis. Hence any organism which circulates in the blood may be transmitted by Stomoxys. The likelihood of its being so will depend on the abundance of the organism in the blood, its power of survival on the exposed tip of the proboscis and the frequency with which the fly bites man. And since man is not a preferred host for Stomoxys the chances of transmission in this way are generally small. The author concludes that they are almost non-existent in the case of sleeping sickness, very slight in dermal leishmaniasis and relapsing fever and smaller still in Weil's disease. In the case of anthrax with its resistant spores it is more probable and proved cases of transmission to man in this way are on record. The possibility of Stomoxys conveying typhoid and paratyphoid bacilli present in the

blood exists but infection in this way is probably of rare occurrence. Infection with streptococci and staphylococci is more frequent with tularaemia it is very rare because *Stomoxys* does not feed commonly on rodents and transmission of poliomyelitis, yellow fever and foot and mouth disease is regarded as disproved. The evidence that has been brought forward to incriminate *Stomoxys* in all these diseases is critically reviewed. *Stomoxys* is of much greater importance in veterinary medicine.

J. B. Wigglesworth

DE LA PAZ (Gonzalo C.) Our Common Houseflies, their Importance as Disease Transmitters, and their Eradication — *Monthly Bull. Bureau of Health Manila* 1939 May Vol. 19 No. 5 pp. 219-230 [24 refs.]

TATTERSFIELD (F.) Biological Methods of testing Insecticides. A Review — *Ann. Applied Biol.* 1939 May Vol. 36 No. 2 pp. 365-384 [87 refs.]

HULL (J. B.) DOVE (W. E.) & PLATT (N. G.) Experimental Diking for Control of Sand Fly and Mosquito Breeding in Florida Salt-Water Marshes — *Jl. Econom. Entom.* 1939 Apr Vol. 32 No. 2 pp. 309-312

Culicoides which we should call midges breed in great numbers in marshy areas along the Florida coast. They cause serious annoyance and reduce the possibility of developing the land. The authors have tried two methods of controlling them.

Methods have been developed for extracting larvae from a sample of about a quart of soil. One may also fix cages to the surface of the ground and trap the adults emerging from natural breeding places. In this way one may precisely delimit the breeding places and obtain an idea of the numbers of midges produced. In the area under study, the insects were emerging from marshy soil which was wet with brackish water. They were confined to the moister areas near ditches as many as 1,200 larvae can be recovered from a quart of soil.

Attempts were made to control the breeding by two methods: flooding the breeding places and draining them. Neither was cheap for the flooding entailed the repeated pumping of water on to the land and drainage could only be accomplished by bringing the water together into ditches and lifting it with pumps so that it ran to the sea. It seems that the second method gave the more satisfactory results. [Owing to an oversight the authors omit to tell us the name of the species with which they were working.]

P. A. Buxton

REYER (Wilhelm) Ueber die Vermehrung von *Blastocystis* in der Kultur [Reproduction of *Blastocystis* in Culture] — *Arch. f. Protistenk.* 1939 Vol. 92, No. 2 pp. 226-244. With 2 text figs. & 3 plates [29 refs.]

The author has studied the structure and method of multiplication of a number of strains of *Blastocystis* in culture. In certain cases pure lines grown from a single organism have been under observation. The only method of reproduction noted is division which takes the form of fission, simple and multiple budding and the breaking up of branched forms. As no kind of fertilization was observed it seems clear that the organism belongs to the fungi.

imperfecti. The interesting conclusion is reached that the supposed budding of *Entamoeba histolytica* described by SCHAUDIN in 1903 was in reality budding of *Blastocystis*. C. M. Wenyon.

HEES (E.) Epidemic Trichomonad Infections and Experimental Studies thereon.—*Jl Egyptian Med Assoc* 1938 Dec. Vol. 21 No. 12 pp 813-837 With 22 figs. 1 diagram & 2 charts. [34 refs.]

In this paper the author makes a number of remarkable claims. He noted in Wiesbaden that human infections due to *Trichomonas vaginalis* were subject to seasonal variations and at one period occurred in veritable epidemic form at a time when the similar genital infection of cattle was exceptionally widespread in the area. The method of infection of *T. vaginalis* is discussed and certain experiments are described. The direct vaginal and cervical inoculation of *T. vaginalis* and of *T. genitalis bovis* failed to give rise to more than transitory infections. On the other hand the similar inoculation of *T. ardis deliculi*, *T. hominis* and a cattle blood strain resulted in an established *T. vaginalis* infection. Furthermore, the subcutaneous inoculation of *T. genitalis bovis* produced a *T. vaginalis* infection in six females. In one case the oral administration of massive doses of culture of *T. genitalis bovis* to an inoperable case of cancer resulted in the appearance of the human intestinal trichomonads in the blood and intestine and *T. vaginalis* in the vagina. It is concluded that all the human trichomonads and those of domestic animals belong to one group, one type transforming itself into another according to circumstances. The domestic animals are to be regarded as reservoirs of the human infections which may occur in epidemic form. It is clear that further evidence is required before the author's very revolutionary view can be accepted. C. M. W.

CARPANO (Matteo) Su alcune inclusioni granulari, coccoide e bacilliformi negli eritrociti e sulla relativa natura (*Grahamella*—*Bartonella*—*Eperythrozoon* *Erythrocytozoon*) [On Certain Granular Coccoïd and Bacilliform Inclusions in the Erythrocytes and their Nature].—*Riv. di Parasiti* Rome 1939, Dec. Vol. 2, No. 4 pp. 257-268 With 2 plates [16 refs.] English summary

The author discusses certain granules which have been described within the red blood corpuscles of mammals and birds and which have been given distinctive names such as *Grahamella*, *Bartonella*, *Eperythrozoon*, *Akapsasma*. These have all been regarded by one or other observers as parasites, but the author believes that in some cases at least the possibility of their being merely products of cell degeneration has not been excluded. C. M. W.

WOLF (Abner) COWEN (David) & PAGE (Beryl) Human Toxoplasmosis. Occurrences in Infants as an Encephalomyelitis. Verification by Transmission to Animals.—*Science* 1939 Mar 10. N. S. Vol. 89 No. 2306 pp 226-227

A child at the age of three days developed convulsive seizures, disturbances in respiration and symptoms indicative of involvement of the spinal cord. Death occurred at the age of 31 days. At post

mortem examination limited to the nervous system a widespread encephalomyelitis characterized by focal areas of inflammation and necrosis and disseminated miliary granulomas was found. An organism identical with toxoplasma was present in all the lesions. The infection was produced in young mice and rabbits by intracerebral inoculation and subinoculated in these animals. Guinea-pigs and chicks were also susceptible. It is concluded that this is the first experimentally proved case of toxoplasmosis in man though four other cases which have been described are mentioned. The name *Toxoplasma hominis* is suggested for the parasite if it is not identical with one of the animal forms already named. C M H

ANDREWS (Mary A.) & SHRIMPTON (E. A. G.) *Intestinal Parasites in Women and Children in Singapore*—*Jl Malaya Branch Brit Med Assoc* 1938 Dec Vol 2, No 3 pp 136-143

The paper records the results of examination by the smear method of 254 women and children in the St. Andrew's Hospital Singapore for intestinal parasites. As regards the helminths (*Ascaris*, *Trichuris*, hookworm and *Clonorchis*) the incidence of infections was lower than that reported by other observers owing undoubtedly to floatation methods having been employed by them. In the case of the intestinal protozoa the usual forms were encountered but generally the incidence was lower than that reported by JEPPI who however was examining dysentery patients at Kuala Lumpur. In the present series there was no racial difference between Chinese and Indians while apart from 14 infants who were entirely negative age appeared to have little influence on the parasite rate. C M H

VAN DEN BRANDEN (F.) & GEELS (J.) *Le permanganate de potasse en solution ou l'eau vinaigrée exercent-ils une action épuratrice sur les crudités?* [The Cleansing of Raw Foodstuffs with Potassium Permanganate Solution or Vinegar]—*Ann Soc Belge de Méd Trop* 1938 June 30 Vol 18 No 2, pp 297-298.

Potassium permanganate in 5 per cent solution fails to sterilize lettuce steeped in it for one hour and even 1 per cent ruins the appearance. Probably the frequent washing in water to remove the colour after the use of permanganate is responsible for removing many of the bacteria and amoebic cysts.

The authors steeped pieces of lettuce in distilled water to which acetic acid in strengths of from 3 to 8 per cent had been added and found that only when the strength approached that of commercial vinegar was the lettuce sterilized. Washing in water after 10 minutes in commercial vinegar preserves the appearance of the salad. C H

REVIEWS AND NOTICES

CORDOBA *Las Actas y Trabajos del VI Congreso Nacional de Medicina* Cordoba. [The Sixth National Medical Congress Cordoba] Vol. 3 1939

Professor Matza and his collaborators publish papers on Chagas's disease in this volume. There are five articles on the infections found in the Reduviid vectors and in animals infected in nature and one on

the pathological anatomy of naturally infected animals. A further paper consists of a discussion of the value of the various diagnostic procedures. Twelve papers are devoted to clinical observations in which both acute and chronic cases are described and one paper contains a record of attempts at chemotherapy. The preparation Bayer 7802 is advocated for the acute type of the disease and where parasites are abundant. Its action is markedly parasitocidal [see also this *Bulletin* 1940 Vol 37 p 146] C II

SOCIEDAD ARGENTINA PATOLOGÍA REGIONAL. Novena Reunión celebrada en Mendoza 1, 2, 3 y 4 de octubre de 1935. En homenaje a la memoria de Carlos Chagas. Segundo Tomo. [The Ninth Congress of the Argentine Society of Regional Pathology]—pp 560-1415. With numerous illustrations. 1937. Buenos Aires. Imprenta de la Universidad.

This volume contains several papers on helminthiasis, leishmaniasis, typhus and other diseases dealt with in this *Bulletin* but as they were presented to the Congress in 1935 and the volume was printed in 1937 but only received in 1940 it is not considered necessary now to publish detailed abstracts. Many papers published since and covering similar ground have received notice in this *Bulletin*. Such as are of public health interest will be abstracted in the *Bulletin of Hygiene*. Volumes I and III were abstracted in this *Bulletin* 1936 Vol 33 p 971 and 1939 Vol 36 p 875. C II

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No. 4

SUMMARY OF RECENT ABSTRACTS *

III MALARIA

(continued from p. 171)

Treatment

General—The general conclusions from the work of the year under consideration appear to be that there is little difference between atabrin and quinine in eliminating schizonts and reducing temperature that short courses with moderate doses are efficient for the immediate attack but allow a considerable proportion of relapses unless followed after a period of a few days, by a course of plasmoquine. The sulphonamides have not been found efficient enough to replace these drugs.

The state of immunity in relation to treatment is discussed by SIMEON (p. 636) who points out first that the injection of a powerful parasiticide in a primary infection reduces the parasite count so suddenly that the body is not called upon to produce immunity and the unchecked multiplication of residual parasites soon recommences. Oral administration of atabrin gives better results than injections which in the author's experience allowed a relapse rate of almost 100 per cent. He further argues that in highly endemic areas a high degree of immunity already exists and that treatment should be adjusted to the immune state of the population concerned. WILSON (p. 126) develops this point of view in dealing with African natives. The only treatment necessary in hyperendemic areas is that required to afford protection to infants and children. This should not be enough to interfere with the acquisition of immunity and in older persons the presence of a few parasites is not in itself an indication for treatment. In the other hand non-immunes for example schoolboys or prisoners entering hyperendemic areas, require special attention including the revision of mosquito nets. RUSSELL (p. 130) however in an area in which 55 per cent. of infants were found to be infected at a single blood examination makes a practice of giving quinine to all children brought for treatment although only 12.6 per cent. had temperatures of 100°F or over.

DECOURT (p. 498) notes that the action of antimalarial drugs is complex, and describes their dysgonic action under the influence of

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

which schizonts lose almost entirely their powers of asexual reproduction and of gametocyte formation. This action is manifested by the absence of morbid phenomena in spite of the presence of schizonts in the blood [but is this not characteristic of the immune state?] The dose of quinine necessary to produce this action is variable at the beginning of treatment but the optimum dose necessary to sustain it when once established is about 0.25 gm. for an adult. Dygonic action lasts about 3 weeks and if the parasite is only slightly aggressive a dose taken twice a month is enough to prevent all morbid phenomena. A small daily dose is less potent than the optimum dose taken at longer intervals and there is no relationship between the curve of dygonic action and the concentration of the drug in the blood or tissues.

MOLLARET and SCHWEIDER (p. 817) have studied the action of rhodoprarquine in induced *P. vivax* malaria and after a dose of 0.03 gm. daily for 3 days. The temperature falls and schizonts and gametocytes disappear but parasites reappear if subsequent auto-haemo-injection is given. These schizonts are well developed but show no tendency to segment or to leave the red cells but the further development of gametocytes is not prevented. If blood containing these inhibited schizonts is inoculated into another person the schizontic capacity of the parasites is regained. This is apparently the dygonic action referred to by DUCOURT (above).

A number of authors have compared methods of drug treatment. CRUCA and his colleagues (p. 11) consider that, for the treatment of attacks of malaria, quinine hydrochloride, atebriin and acrinquine are therapeutically equal. Doses should be not less than 1 gm. quinine or 0.3 gm. atebriin daily and the length of treatment not less than 7 days. Mixtures of schizonticides are not recommended and a mixture of atebriin and plasmoquine should be avoided (but see MACMARTON below). Atebriin followed by plasmoquine is the most efficient remedy in preventing relapses of quartan and subtertian malaria, and plasmoquine 0.02 gm. every 5 days is enough to devitalize *P. falciparum* gametocytes. Atebriin is not tolerated by children under one year of age. In a series of 269 cases, CRUCA *et al.* (p. 924) found that quinine and atebriin whether combined with plasmoquine or not, did not prevent the appearance of gametocytes in 149 instances. On the other hand a single dose of 0.02 gm. plasmoquine was effective in eliminating gametocytes and the authors advise that this dose should be given 3 or 4 days after the completion of the course of schizonticidal drugs and repeated, as stated above every 5 days.

Opposing the view that the simultaneous administration of atebriin and plasmoquine appears to aggravate the toxicity of each MACMARTON (p. 259) states that in his hands this method has given incomparably better results than any other form of treatment. Since however these drugs should only be given on a full stomach, he first treats his patients with quinine until food can be taken. The infections were mainly by *P. falciparum* and more than 75 per cent. have had no recurrence. In Greece LIVADAS *et al.* (p. 397) conclude that combinations of quinine and plasmoquine or of atebriin and plasmoquine are especially useful. Atebriin has the quickest action on fever and in causing the disappearance of schizonts. Plasmoquine alone is the least efficient as a febrifuge but is the only drug which will destroy gametocytes of *P. falciparum*. Quinoplamin is the most active in the reduction of splenomegaly and in preventing relapse but quinine is more effective

than the synthetic drugs in causing an increase of red cells and of their haemoglobin content.

Quinine—In *P. vivax* infections, BOYD and KITCHEN (p 497) found that 11 grains of quinine administered on a single day suppressed paroxysms and induced periods of clinical quiescence of varying durations. Nothing comparable with this occurred in *P. falciparum* infections even after a dose of 20 grains.

The findings of the Malaria Advisory Board of the F M S (p 128) indicate that totaquina type II is as effective as quinine and only half as expensive. Paludex was not found to be satisfactory with the local strain of *P. falciparum*. Malarene a proprietary preparation stated to contain the amorphous alkaloids of cinchona was found by GUEST (p 397) to be inferior to quinine in controlling fever and eliminating parasites. LEVITZ (p 923) used hydrochloride of hydroquinine 0.6 gm daily (in 3 doses) for 7 days in 262 fresh cases of benign tertian malaria and regards it as superior to quinine.

Agranulocytosis apparently due to quinine is reported by FAIGUENBAUM (p 497) and HAUER (p 923) gives details of an instance of inherited quinine hypersensitivity.

Comparing the results of treatment of *P. falciparum* infections with quinine sulphate and with quinoplasmin or plasmoquine CO KALMUS and KOSTIC (p 263) found a much lower proportion of both early and late relapses with the latter combinations. GEVITZROW and CALLENDER (p 257) in Panama found that quinine in the rather large doses employed was somewhat more effective than atebrin in preventing *P. vivax* relapses, and markedly more so in *P. falciparum* infections. Plasmoquine with or without atebrin has a pronounced effect upon the relapse rate of all forms especially *P. vivax*.

Atebrin and plasmoquine—GORBITZ (p 257) considers that from all points of view atebrin is to be preferred to quinine as a schizonticide since it is tolerated better and gives rise to less important subjective symptoms. BOCK (p 924) describes the morphological changes undergone by parasites during atebrin treatment. The drug apparently acts directly on the parasites.

SIEGENBEEK VAN HEUKELOM and OVERBEEK (p 258) treated a series of patients with two intramuscular injections of atebrin 300 mgm. each followed by atebrin by the mouth starting 5 days after the last injection. Immediate results were good, and early relapses few. They point out that in patients with jaundice or with damaged livers atebrin should be given with caution. Intoxication is more frequent after injection than after oral administration and injections are not suitable for mass treatment. FIELD *et al* (p 498) in an extensive trial, found atebrin musonate to be effective in controlling acute attacks of the three forms of malaria. It has however no advantage over quinine against gametocytes of *P. falciparum* and is not suitable for routine treatment for which the method of choice is by drugs administered orally.

KERKHOFER (p 259) reports an early relapse rate of 25.9 per cent in tertian fever treated with acriquine. The drug is well tolerated. MALYCHEVA (p 785) found fewer late relapses in patients receiving acriquine in three periods (5, 3 and 3 days) separated by 10 days intervals than in those receiving it on 7 consecutive days.

From an extensive trial FASTOVSKAYA and CHENDEROWITCH (p 683) conclude that the Russian synthetic remedies acriquine and plasmocide are in every way as effective as quinine and that in the doses used (acriquine 0.15 gm twice daily for 7 days; plasmocide 0.03 gm twice

daily for 5 days) they can be recommended for mass treatment. BARBOSA (p. 12) advises short treatments of 7 or 8 days only for *P. vivax* primary infections and reinfections and uses atebirin associated with plasmoquine. Atebrin for 5 days followed by plasmoquine for 4 days gives excellent results in *P. falciparum* infections.

In the prevention of relapses and of the development of "healthy carriers" in Holland the Malaria Commission (p. 401) recommend the 3-week plasmoquine cure advocated by SYTOV [see this *Bulletin* 1930 Vol. 27 p. 658 1931 Vol. 28 p. 596 1936 Vol. 33 p. 683].

STAUSS (p. 683) discusses the by-effects of plasmoquine and atebirin. The former should be given in daily doses of 0.01 gm. per ten kilo. body weight. Plasmoquine plus atebirin is not so well borne as either alone, but if in the ratio 1:20 as in atepo tablets, there are fewer complaints. It is better to start plasmoquine treatment some days after the atebirin course is ended. In plasmoquine treatment there may be slight harmless albuminuria, and intracellular methaemoglobin is responsible for cyanosis. Liver damage and all circulatory symptoms recorded may be due to the drug but can be seen equally in untreated malaria. Albuminuria, haemolysis and methaemoglobin formation are not caused by atebirin—the yellow colour developed is in no way connected with jaundice. CHOREMIS and SPILIOPOULOS (p. 306) report cases of laryngeal and other paralyses and of peripheral neuritis following the administration of atebirin or plasmoquine. They conclude that these drugs are neurotropic and advise that courses should not exceed 5 days, and that those suffering from malarial cachexia should receive smaller doses than those customarily prescribed, together with one of the vitamin B preparations. Haemoglobinuria in a patient who had, during the three days before its onset, been taking full doses of atebirin without other drugs, is described by LUCHMANI (p. 397). After recovery the patient was treated with atebirin without ill effects.

DOROTSEVA (p. 259) reports on the pharmacology of plasmoquine and acriquine compound.

Tests.—PRUDHOMME (p. 784) describes a new method for the detection and estimation of quinine in urine.

LATASTE *et al.* (p. 815) describe a method for estimating quinine in the blood. The drug has a definite affinity for the red cells, but only 4 per cent. of the total amount ingested could be found in the blood. FARNAUD *et al.* (p. 816) show that the maximum concentration of quinine in the blood for any given individual remains constant whatever the number and frequency of treatments: repeated administration results in excessive urinary excretion but no increase in the blood maximum.

TCHITCHIBARINE and HOFFMANN (p. 580) describe a test, in which HIO is used, for the detection of plasmoquine, rhodoquine and plasmoquine in urine. NAKDI and DICKERT (p. 1008) describe a test for plasmoquine in tissues, but which cannot be used with urine.

Sulphonamides.—Various sulphonamide preparations were tested in benign and subtertian infections by DURAND (p. 814) but he concludes that they cannot replace the usual drugs. NIVEN (p. 399) has tested sulphanilamide in all three types of malaria and concludes that in comparison with quinine (with which controls were treated) it is much less efficient, more dangerous and much more costly. FAGET *et al.* (p. 280) report unfavourably on protonsil and sulphanilamide as a result of the treatment of one *P. falciparum* and two *P. vivax* cases and MEYER and MOER (p. 796) report unfavourably on protonsil.

SORLEY and CURRIE (p 400) however found sulphanilamide to cause rapid alleviation of symptoms in *P vivax* infection but in view of the persistence of parasites and of relapses they recommend that this treatment be followed by a course of atabrin FARINALD and RAGIOT (p 788) found that soluseptasine though useful against schizonts had no action on gametocytes of *P falciparum* and *P malariae* though gametocytes of *P vivax* were eliminated. PAKENHAM WALSH and RENNIE (p 12) report that sulphonamide preparations eliminated parasites from the blood and caused cessation of rigors in a patient with *P vivax* infection but there was a later relapse

SINTON *et al* (p 925) record experiments which show that prosep-tasine appears to have a true causal prophylactic action against the strain of *P falciparum* used in the sporozoite stage

Other drugs — COORHOVE (p 280) obtained success in the treatment of malarial splenomegaly by intramuscular injections twice daily of 2 cc iodinequinine (a mixture of quinine adrenalin iodine and glycerol)

KIKUTHI (p 816) states the properties of certuna (cilonal) It is well tolerated it can prevent exflagellation it acts against gametocytes of *P falciparum* and *P vivax* and in minimal doses it arrests the development of the fertilized female at the oöcyst stage It has no prophylactic action in induced human malaria. Although cilonal (certuna) in doses of 0.03 gm. three times daily to a total of 0.35 to 0.4 gm. is usually sufficient to eradicate gametocytes of *P falciparum* CHOPRA *et al* (p 499) prefer plasmoquine which in doses of 0.02 gm. daily for 3 days is not toxic and is effective SINTON *et al* (p 401) found that certuna which is effective against the gametocytes of *P falciparum* failed to prevent infection by sporozoites when given to patients in varying doses and at various intervals before the sporozoite injections. CHOPRA and BASU (p 786) failed to prevent infection of mosquitoes by treating three *P falciparum* gametocyte carriers with cilonal.

DE NUNNO (p 500) considers antimony tartrate to be a causal prophylactic in that patients lose the power of infecting anophelines. Series of patients treated with quinine and with antimony tartrate were compared the development of gametocytes was much less in the latter and in those treated after gametocytes were present the gametocytes in the latter group lost their normal appearance and disappeared rapidly from the blood. Antimony tartrate is given intravenously in a 1 per cent. solution on alternate days to a total of 120 to 200 cc.

GOLDMAN (p 398) as a result of trial in 24 induced and one natural infection with *P vivax* considers mapharsen (an arsenated benzene compound used in syphilis) to be the drug of choice Parasites disappear almost at once and further febrile attacks are prevented unless due within 24 hours of the injection of the drug It is as effective as atabrin and is safe recurrences are rare The dose is 0.04 to 0.06 gm. intravenously according to the patient's weight and the patient should be fasting

VAN RIEL (p 787) failed to obtain useful results with cuprochin in *P falciparum* infections.

DEVINE (p 13) has studied the changes in blood and urine caused by undecane diamidine. These cannot be further abstracted.

The Ascoli treatment — PIZILLO (p 685) considers that the Ascoli method of treatment represents an exact reproduction of the spontaneous recovery from the disease He (p 12) treated 16 cases of

recently acquired primary infections by this method. Very small doses of quinine in addition to the adrenalin are sufficient to control the fever and splenic enlargement does not occur. He (p. 813) reports a patient suffering from a relapse of *P. falciparum* malaria who was treated with adrenalin. Quinine was given during the febrile periods but suspended when the temperature fell. Grave symptoms appeared during a recurrence of fever but improved under quinine and adrenalin and complete recovery ensued. The author points out the apparent efficiency of adrenalin in the treatment of pernicious symptoms (but it is at least possible that continuous quinine treatment may have prevented the onset of the pernicious symptoms. It is noticeable in the information given that these dangerous symptoms disappeared when quinine was used. During the first four days of fever the patient was given no treatment—the wisdom of such a procedure in subtertian malaria may be questioned). He (p. 400) discusses the late febrile manifestations which are occasionally experienced after the termination of the Ascoli method of treatment. These differ from true relapses in that recovery is spontaneous.

Drug Prophylaxis

Should the present war extend to countries in which malaria is endemic the subject of drug prophylaxis will be important to the combatant armies. The work here summarized deals with indigenous populations, immune or partially immune, and with groups of labourers, probably immigrants and probably at least partially immune. Although there has been no recorded work during the year on the protection by drugs of non-immune immigrants to endemic areas, it is possible that measures required for European troops in malarious countries would be on the lines here advocated for the labour groups, and, partly for that reason, this division has been made.

Indigenous populations—The Anti-Malarial Service of the Institut d'Hygiène of Morocco (p. 686) relates drug prophylaxis to the state of premunition existing. In a premunized population in a hyperendemic area, it is enough to treat children and those suffering from attacks. In a population insufficiently premunized, the drug used should be given to the whole population, the rhythm being determined by the intensity of anophelism and the rate of gamete carriers. In Morocco weekly administration is enough, but fortnightly is insufficient where anophelism is high [compare Wilson above]. DECOURT (p. 818) discusses prophylaxis with quinacrine, rhodopræquine or an association of the two prenaline. A fixed daily dose of quinacrine should be used and the rhythm varied with the circumstances. The association of a gametocide is advantageous and if antiparasmodial measures are adopted the drugs should be given twice each month.

In Abyssinia CORRADETTI (p. 677) recommends prophylactic quinine 0.6 gm. on three consecutive days each week during the malaria season. DE MELLO (p. 9) administered plasmoquine 0.02 gm. and quinine sulphate 0.3 gm. daily for 8 days, followed by the same doses once a week for 12 weeks, to a community in Portuguese India in which the spleen rate was over 50 per cent. A considerable decrease in fever resulted.

CLARK and KONE (p. 819) consider that the treatment of sub-clinical cases may destroy a certain amount of immunity in hyperendemic

areas. Drug prophylaxis failed to control the cyclical epidemic of malaria in Panama in 1935 but the administration of quinine sulphate 15 grains daily or atebryn 0.1 gm. thrice daily for 5 days followed by plasmoquine 0.01 gm. twice daily for 5 days to all carriers discovered in the monthly surveys has almost abolished clinical illness without eradicating the disease. WINCHESTER (p. 687) in a *P. falciparum* area in Georgia U.S.A. found that 0.05 gm. ntebryn daily from May to October greatly reduced the parasite and spleen indexes of a negro population in comparison with a control group. In a district of Georgia, U.S.A. where mosquito control was impossible HILL and GOODWIN (p. 261) found that atebryn $1\frac{1}{2}$ grains three times weekly reduced by over 17 times the proportion of clinical attacks in a group so treated in comparison with a control group. The experiment lasted 2 years. BISPIAN (p. 500) uses $4\frac{1}{2}$ grains of atebryn weekly for 4 weeks or longer as a prophylactic in the southern U.S.A. and believes that even in a highly infected area this will maintain maximum effectiveness and minimum infection. Over 90 per cent of *P. vivax* carriers can be cleared of all parasites.

MELIK ADAMIAN (p. 262) in Russia considers that prophylactic treatment with acridine should be reserved for those who have suffered from malaria the previous year. Identification and treatment of parasite carriers are important measures. KOSTIĆ and ANTIĆ (p. 924) report good results from the prophylactic use of atebryn in a group of prisoners and warders in an endemic area in Yugoslavia.

Selected groups probably immigrant peoples—The Malaria Advisory Board of the F.M.S. (p. 128) find that 0.3 gm. atebryn weekly suffices for the effective control of clinical malaria [presumably in estate workers]. TEICHLER (p. 785) treated prophylactically 500 natives of Tanganika Territory in a highly malarial district with 0.1 gm. atebryn thrice daily for 3 days and considers that by giving such short courses a labour force may be kept healthy although malaria is not eradicated.

In a hyperendemic area of Cochun-China CANET (p. 818) advises for plantation labourers the adoption of antilarval and other measures combined with drug prophylaxis varied to suit conditions. He gives 0.3 gm. quinaquine as a daily dose normally once a week but on the advent of heavily infected labourers or during cold spells or arduous labour may give this dose every 5 or 3 days. The association of a gametocide has not in his experience served any useful purpose.

In contrast to his experience in treating fresh sporadic cases of malaria with atebryn injections [see above *Treatment*] SIMMONS (p. 686) records the great diminution in malaria incidence among mill workers in the Deccan following his introduction of the method of treating every new case with two atebryn injections without quinine or plasmoquine. Oiling of river beds in the dry season was carried out. This was previously an area of severe endemic malaria, and probably a high degree of immunity is present.

In a military post in French Indo-China in which prophylactic quinine had been insufficient CHARBONNIER (p. 501) found a marked improvement after the addition of quinaquine 0.2 gm. and praequine 0.02 gm. once weekly. Neighbouring posts not so treated continued to experience severe malaria.

FATTOVICH and LENTI (p. 262) used manganese iodo-mercurate and spleen extract together. They consider that a real prophylactic action is obtained possibly through the reticulo-endothelial system.

Other Methods of Control

BOYD (p. 808) remarks that malaria control should be not a campaign, but a long term programme and that malaria should be built out. HACKETT *et al.* (p. 830) give an account of naturalistic methods in the control of malaria.

In hyperendemic areas in East Africa WILSON (p. 126) points out that the only available method of control is anopheline control, which is far too expensive unless there are strong reasons for its adoption, for instance the aggregation of a large number of non-immunes. It is necessary in townships, temporary undertakings such as railway construction, on estates and along railways where for example stopping places occur in dangerous districts.

Oiling—WATS and BHARUCHA (p. 10) show that cashew nut oil is very toxic to larvae, rapid in action and cheap. In spite of the variations in toxicity in the oil from different sources and of the fact that it is a skin irritant even when diluted with kerosene, its use is worth consideration. AFANASSIEV (p. 788) finds the distillate of coke filters to be an efficient larvicide oil.

MICHELSON (p. 403) describes an arrangement of wicks leading from tins of oil to gunny screens for the continuous oiling of streams. BLACKLOCK (p. 336) has devised a method for oiling the water in flushing cisterns.

Other larvicidal methods—SANTILLANA (p. 581) shows that the mixture of toxic powder larvicides with large volumes of tale is irrational from the point of view of the alimentary physiology of larva and is unnecessarily costly. The resistance of larvae to the action of arsenical poisons increases with age. BRINK and DAS CHOWDHURY (p. 1009) show that *A. stephensi* and *C. fatigans* cannot breed in water containing 0.75 per cent. ammonium sulphate.

WASSILIEFF (p. 332) writes of the value of Gambusia.

MAXSON (p. 1009) describes the larvicidal action of certain Asamese plants. AMBIALET (p. 335) found Williamson's herbage cover method to be unsuitable to conditions in Constantine, Algeria.

STRICKLAND (p. 137) shows that in the coastal lagoons of Orissa *A. aegypti* will breed if communication with the sea is maintained but will not if the lagoons are banded up and receive only fresh water.

STROTHER-SMITH (p. 403) states that in a cantonment in India the institution of a weekly "dry day" during which all water receptacles must be empty for 3 hours, has resulted in a marked diminution in mosquito prevalence.

MACDONALD (p. 926) has designed a siphon for the automatic flushing of streams.

HIXMAN (p. 334) shows that fluctuation of the water level in reservoirs in Alabama kills much of the vegetation round the edge which becomes almost clean and therefore renders extensive breeding of *A. gambiae* impossible.

PEASTON and REXNER (p. 928) report the improvement in general infection rates attributed to permanent canalization of a stream and permanent street drainage in part of Freetown, Sierra Leone.

Spraying of insecticides.—The spraying during late summer and autumn of houses regarded as centres of infection in Holland is reported by the Malaria Commission (p. 401). Shelltox was used and it was found that spraying was necessary every 14 days, during which time the houses remained, with the generous amounts used, unattractive to

mosquitoes. Results in one village were satisfactory in that the incidence of malaria the following year was greatly reduced. A *maculipennis atroparvus* is in this way prevented from infecting man in autumn and it is known that many persons infected then only show symptoms the following spring. MOREAU (p 332) finds that spraying with a watery suspension of pyrethrins is a valuable addition to classical methods of prophylaxis. In a native house a daily spraying at 5 p.m. enabled one after the second day to pass the night without being bitten. The details are given in the original abstract. Spraying with 3 per cent lethane in kerosene with a Phantomyst spray was successfully used by STROTHER SMITH (p 403) for the destruction of adult mosquitoes.

POTTER and HOCKING (p 921) describe an apparatus in which flying insects can be subjected to a finely divided cloud of insecticide and from which samples of the atmosphere can be taken for study.

Screening—DAVEY and GORDON (p 582) after careful experiment recommend that the maximum size of aperture for screening against mosquitoes in W. Africa must not exceed 0.047 inch (1.2 mm.) this aperture is provided in a screen of 16 meshes to the linear inch and composed of wire of 28 Standard Wire Gauge.

Malaria of Monkeys and Birds

Aetiology—HEWITT (p 336) has noted growth of young intra corpuscular forms of *P. cathemerium* in infected blood added to a culture medium of egg slope saline dextrose and serum. GAVRILOV *et al* (p 929) show that *P. gallinaceum* will remain alive and virulent for 21 days in defibrinated blood at 0° to 5°C and for 10 days in cultures of bone marrow.

BASU (p 587) describes a new parasite of herons which he proposes to name *P. heroni*. development to the oöcyst stage was observed in *C. faligans*.

HEWITT (p 1009) describes a staining technique for demonstrating avian malaria parasites in tissue sections.

HEGNER and ESKRIDGE (p 338) found that 90 per cent. of the merozoites of *P. relictum*, *P. circumflexum* and *P. elongatum* enter the young red cells of birds. HEWITT (pp 585 929 1010) shows that *P. cathemerium* has a special affinity for young red cells. When these are few in number multiple infections are common and *vice versa*.

HENRY (p 929) demonstrated a latent period of 4 or 5 days after mosquito infection before the blood of fowls becomes infective.

DECOURT and SCHNEIDER (p 586) describe granules seen in lymphoid cells of the lymphoid masses and the blood of fowls apparently recovered from *P. gallinaceum* infection. The masses of lymphoid tissue in these fowls were found to be infective to others although the spleen was not, and although no recognizable parasites could be found. They think that these granules may represent a stage of development of the parasites.

Exo-erythrocytic Schizonts—Discussing the unpigmented exo-erythrocytic forms of bird malaria parasites KIKUTH and MUDROV (p 337) conclude that they play a definite rôle in the malaria cycle and that they do not belong to the toxoplasma group. KIKUTH (p 816) states that these forms are not susceptible to known drugs though plasmoquine may be exceptional. Similar forms have been found in

bone marrow in man. GIOVANNOLA (p. 930) also considers exo-erythrocytic schizonts in *P. gallinaceum* infections as stages in the development of the parasite.

JAMES and TATE (p. 339) describe exo-erythrocytic schizogony in *P. gallinaceum* infection of fowls, noting that these schizonts appear after both sporozoite infections and blood inoculations. They are not found until intra-erythrocytic forms appear and they are present first in the brain, where they may give rise to generalized paralysis. RAFFAELE (p. 931) postulates two types of merozoites arising from exo-erythrocytic schizonts, the histotropic for continuation of exo-erythrocytic schizogony and the haematropic for initiation of erythrocytic development. The fact that atelrin fails to destroy the non-pigmented forms in birds may explain its inability to act as a prophylactic in man. CHORTIS (p. 930) however thinks that they are merely young parasites engulfed by the reticulo-endothelial cells, and play no real part in development. MAXWELL and GOLDSTEIN (p. 1011) agree with this view. HEGGER and WOLFSON (p. 584) conclude that it is not yet proved that they belong to the *Plasmodium* concerned (*P. calhemarium* in their experiments). DUCOURT and SCHWEIDAR (p. 586) regard them as accidental by-products following infection both by sporozoites and blood inoculation.

RODEADY (p. 931) found exo-erythrocytic schizonts in *P. relatum* infections of penguins, both after sporozoite infection and inoculation of infected blood.

Transmission—ROUBAUD *et al* (p. 928) show that *P. gallinaceum* will develop completely in *Aedes gemuculatus*. HERMAN (p. 337) has investigated the mosquito transmission of *P. circumflexum* and *P. calhemarium*.

BRUMPT (p. 404) discusses the origin of Ross's Black spores and regards them as chitinized oöcysts or chitinized groups of sporozoites. Other extraneous bodies may become chitinized but the author has never found black spores in mosquitoes fed on uninfected fowls or on birds infected with parasites which do not develop in the mosquitoes used.

Pathology and Serology—AFRIDI (p. 823) studied the spleen of monkeys after it has been brought to an accessible situation by operation. In *P. cynomolgi* infection the chief enlargement occurred after the peak of parasite infestation but in *P. knowlesi* before the peak. In *P. knowlesi* infection the peripheral blood lags 2-4 hours behind the splenic blood in the number and stages of the development of the parasites.

TOMA and CROCA (p. 822) show that in monkeys malarial infection is associated with hypertrophy of the RES in those organs in which the infected red cells come into close contact with histiocytes, and maintain that lymphocytes do not become transformed into macrophages. Lymphatic glands do not contribute to the defensive process. This view does not agree with that of GARDHAM (p. 492) who considers that lymphocytes reaching the placenta in pregnant women multiply and become converted into phagocytic macrophages under the malarial stimulus. YOUNG (p. 338) shows that in canaries the severe *P. calhemarium* infection causes a rapid activation of lymphoid tissue and mononuclear cells in the spleen, and of bone marrow and liver whereas with the milder *P. rouxi* infection the activation in the spleen is limited to the mononuclear cells of the red pulp. Resistance to superinfection appears to be correlated with the degree of macrophage phagocytosis.

during the acute stage extensive phagocytosis results in well developed immunity

BLOOM and TALIAFERRO (p 586) describe the process of regeneration of the infarcts commonly seen in the spleen of canaries infected with *P. cathemerium*

EATON (p 405) shows that agglutinins against infected red cells or liberated (mature) parasites are found in monkeys infected with *P. knowlesi*. The reaction is specific and the titre rises as the infection subsides or if superinfection is induced. He (p 821) describes a soluble antigen present in the serum of monkeys suffering from acute *P. knowlesi* infection which gives a strong complement fixation reaction with serum from hyperimmunized animals. Monkeys immunized with this antigen are in no way immune to infection. COGGESHALL and EATON (p 404) have prepared, from the blood or spleens of monkeys infected with malaria antigens which give positive complement fixation reactions with serum of infected animals. Some animals which produced large amounts of protective antibodies were bad producers of complement fixing antibodies and the two are therefore probably distinct. They (p 405) show that the severity of *P. knowlesi* infection in *M. rhesus* does not depend on the size of the infecting dose. Serum from chronically infected monkeys will protect against death if administered at the time of the injection of parasites and daily afterwards, and if incubated for half an hour with the parasites may kill them.

MOSNA (p 827) shows that the serum of monkeys suffering from chronic *P. knowlesi* infection contains small amounts of immune bodies of a protective nature. Although the antibody content of the blood of monkeys in the chronic stage of *P. knowlesi* infection is low COGGESHALL and HUMM (p 406) show that it may be greatly raised by superinfection to an optimum of 7 times during two months. CIUCA *et al* (p 823) show that after recovery from *P. knowlesi* infection of man there is a definite immunity independent of premunition.

Experiments carried out by HEGNER and ESKRIDGE (p 585) indicate that serum from birds in the acute stage of *P. cathemerium* infection contains some substance which, though unable to suppress the infection in fresh birds is capable of warding off the ill effects of that infection.

Clinical—HUFF (p 1010) shows that segmentation of bird malaria parasites produces no rise of body temperature.

BOYD (p 1011) found that the rapid fall in the numbers of *P. cathemerium* at the crisis of the initial attack is due to the combined effect of lowered multiplication rate and increased destruction.

MILAM and COGGESHALL (p 583) record observations on the duration of *P. knowlesi* infections in man and note that human blood may be positive to monkeys although parasites may never have been detected in smears. Similar invisible infections may occur in human malaria undetected for want of a suitable host.

SINTON *et al* (p 583) record failure to infect man with *P. cynomolgi*.

Treatment—KRITCHEVSKI (p 13) points out the importance of the integrity of function of the reticulo-endothelial system for the intrinsic action of antimalarial drugs. Trypan or pyrrole blue administered to canaries infected with *P. praecox* renders otherwise inactive doses of plasmodicide active, renders active an otherwise inactive quinine compound but has no effect with quinine or atabrin. Trypan and pyrrole blue are both deposited in the R.E.S. where it is thought that they react with plasmodicide to give a new compound.

CHRISTOPHERS and FULTON (p. 340) give an account of the course of *P. knowlesi* infection in monkeys. Atebrin is effective in treatment but relapses invariably occur. 1:11 normal undecane diamidine is active but less certain than atebrin.

DAS GUPTA and CHOPRA (p. 583) found that although protosol soluble will cure *P. knowlesi* infections in monkeys, it is not so satisfactory as atebrin and the doses required are out of all proportion to the human doses. RODHAIN (p. 1011) finds streptine to be active against *P. reichenowi* infections of chimpanzees though not so effective as atebrin.

MANWELL and HARING (p. 588) show that *P. rougheuxi* infections are highly susceptible to atebrin and plasmoquine.

CHOPRA and DAS GUPTA (p. 1012) find M. & B. 683 better than atebrin in *P. knowlesi* infections in that it is capable of preventing relapse. COGGERHALL (p. 824) reports that sulphadiazide is capable of eradicating completely *P. knowlesi* infection of *M. rhesus* but that there is evidence of residual immunity for about 3 months after treatment.

C. Wilcocks.

THE TYPHUS GROUP OF FEVERS.

PRESENT OF ABSTRACTS IN THIS SECTION

General—GIROUD (p. 252) shows that in the nodules produced by intradermal injections of typhus virus in animals there is only a small amount of virus and if these nodules are excised and emulsified and reinoculated intradermally in series the virus content falls progressively.

SALEUY (p. 253) describes a fatal disease of dogs in Brazzaville which is connected with Rickettsia-like bodies.

BURNET *et al.* (p. 253) found no relationship between the Rickettsia of Q fever and other rickettsial diseases, but quote DYER who found some relationship with the virus obtained from wood ticks in Montana. PARKER *et al.* (p. 254) have recovered a mildly pathogenic Rickettsia-like agent from *Amblyomma maculatum* in Texas. The infection gives complete cross immunity reactions with Rocky Mountain and boutonneuse fevers, but is apparently not identical with either. COX (p. 254) failed to cultivate in cell-free medium the infectious Rickettsia-like agent previously isolated from ticks in America. Since this agent is a filter passer the name *Rickettsia diasporica* is suggested.

MACCHIAVELLO (p. 254) gives the details of the normal blood constituents of white rats which he uses in experimental work on typhus.

Louse and Flea-borne—IONESCO-MIHAIESTI *et al.* (p. 255) report that in Bessarabia there were 9 000 cases in 1936 and 1937 but the numbers diminished greatly thereafter. Numerous personnel were employed in the campaign of detection and isolation of cases and in mass delousing. MARIANI (p. 255) states that typhus in Abyssinia is largely louse-borne.

MACCHIAVELLO (p. 255) found that in dried and frozen infected tissues the virus survived from 53 to 79 days. He (p. 255) gives his

reasons for believing that *R. prowazeki* and not a filterable virus is the cause of typhus. He (p 256) details a method for staining Rickettsia.

RAYNAL *et al* (p 256) as a result of researches in Shanghai state that the common murine type may, under exceptional conditions of overcrowding (as with refugees) be transmitted from man to man by lice during the course of which stage the virus becomes modified to an intermediate between the murine and classical types. CLEAVE (p 257) reports two cases from Hong Kong.

JOANNON INFANTE (p 258) describes a rapid microtest method for performing the Weil-Felix reaction and records close agreement between the results obtained in this way and those in the same patients obtained by the standard technique.

MASUCCI (p. 257) gives general directions as to treatment and GIUNTA and D'IGNAZIO (p 257) recapitulate their method of combining drug treatment with vitamins B and C. LE RENARD and RAYNAUD (p 258) report recovery after decapsulation of one kidney in a patient with suppression of urine in typhus. Toxic nephritis is a common cause of the nervous symptoms and coma experienced.

REITLER *et al* (p 259) describe two types of endemic typhus in Palestine one moderately severe with high titre *Proteus* $\lambda 19$ reaction the other very severe with low titre *Proteus* $\lambda 19$ reaction. These usually affect non-immunized immigrants. CASTANEDA and SILVA (p 259) isolated murine intermediate or epidemic virus from patients admitted to the General Hospital of Mexico City.

RUGE (p 259) reports a case of murine typhus in a sailor at Hamburg and thinks that infected rats may have boarded his ship at a Spanish Mediterranean port.

ROBERTS (p 260) shows that in Kenya besides the tick borne type of typhus there exists also the flea borne murine type. MAISTER *et al* (p 260) report a case of flea-borne typhus contracted in a grain store in Natal, S Africa rats and fleas caught in the store were found to be infected. LIU and CHUNG (p 261) report murine typhus in Peiping and WOLFF (p 261) recovered a murine strain from rat fleas in Ceylon.

PANG (p 261) shows that the murine virus produces a local lesion on the chorio-allantoic membrane of fowl embryo as well as a generalized infection which often kills the embryo. CASTANEDA (p 261) describes haemorrhagic lesions in the lungs and the presence of Rickettsia in the cells lining the bronchi of animals infected by the nasal route.

WOLFF and DE GRAAF (p 262) show that animals can only be infected with the blood of patients with shop typhus (*Proteus* $\text{OX}19$ type) if the blood is taken during the period of fever. A scrotal reaction is given which differs from that seen in infection with *Sp. muniti* and *Pf. whitmorei*.

BLANC *et al* (p 262) show that the donkey louse can be infected from an animal infected with the murine virus.

Tick-borne—SALEUN (p 263) reports boutonneuse fever diagnosed at Brazzaville.

MACVICAR (p 263) reports tick-bite fever with local lesion in 4 natives in S Africa. GEAR and DE MEILLON (p 263) have established in guineapigs a strain of virus from *Haemaphysalis leachi* which is immunologically similar to strains of tick-bite virus isolated from man but does not protect against endemic or epidemic typhus. *H. leachi* is capable of transmitting the infection while biting and feeding.

TOPPING (p. 264) found no benefit in the treatment of experimental Rocky Mountain fever and endemic typhus with pronitell or sulphapyridine.

Asia-borne.—WOLFF and DE GRAAF (p. 264) describe two cases of mite-borne typhus in Java where it is rare. The strain is identical with Sumatran and other strains and field rats are able to act as the reservoir of the disease. ROTON (p. 265) describes a case of fever with severe complications in Annam. Although the Weil-Felix reaction was negative he regards it as a case of tsutsugamushi fever. MORIMITA (p. 266) records 166 cases in Formosa during the period 1933-38. JOLLY and DI RUGGERO (p. 266) observed in Guadeloupe a case of typhus in which *Proteus OXA* was agglutinated.

LE COSQUENO DE BUSSEY and VAN LOGHEM (p. 266) found that strains of *Proteus* isolated in Holland were agglutinated in high titre by some scrub typhus sera from Sumatra. They conclude that an X component is inherent in every strain of *Proteus*.

Vaccination.—LAURET and DURANT (p. 266-267) have been able to stabilise the virus of typhus for vaccination purposes by intraperitoneal injection into mice of mouse brain infected by previous intraperitoneal injection. The infected brains are used in preparing the vaccine, and 7 000 persons have now been successfully vaccinated. SPARROW (p. 267) obtained heavy growths of murine *Rickettsia* by infecting lice by the anal route. With MAKESCHAL (p. 268) she showed that the intestine of these lice may be used to infect man by the conjunctival route a mild fever is produced, but by subcutaneous injection typical typhus may result, but depends on the size of the infecting dose. PERKINOV and BUSEY (p. 268) show that rats maintained on a diet deficient in riboflavin and infected with typhus die with a profuse peritoneal exudate rich in *Rickettsia*. This method may be useful in preparing vaccines. COX (p. 268) shows that a vaccine prepared from infected fowl embryos and killed by carbolic and formalin protected guinea-pigs against Rocky Mountain virus.

BLANC and BALTARD (p. 269) show that immunity after vaccination with the murine virus or an attack of murine typhus may protect against that type and against epidemic typhus for at least 5 years, and therefore advocate regular vaccination in endemic areas.

KAWAMURA *et al* (p. 269) considers that the Pescadore strain of tsutsugamushi virus may be used as a preventive vaccine in the endemic regions. KAWAMURA and UEDA (p. 269) describe their method of using this strain in the fever therapy of G.P.I. It is safe and apparently successful and can easily be handled. C II

GIROUD (Paul). Dosage de la virulence des nodules cutanés provoqués par l'inoculation ou la réinoculation de *Rickettsiales*. Pouvoir neutralisant de la peau. (Measurement of the Virulence of the Cutaneous Nodules produced by the Inoculation or Reinoculation of *Rickettsia*. Neutralizing Power of the Skin.)—C R Soc Biol 1939 Vol. 131 No 22 pp 1154-1156.

When an emulsion of typhus virus (strain of guinea-pig) is inoculated into the skin of rabbit or guinea-pig a nodule is produced. If this nodule is excised and emulsified and injected intraperitoneally into a guinea-pig infection results with fever and orchitis but it does not produce any reaction if injected intradermally.

A nodule due to a third inoculation produces infection and a slight reaction in the skin. A sixth inoculation nodule does not produce any fever and gives no reaction in the skin.

The impression gained is that there is only a small amount of virus in the skin nodules and this becomes less and less after reinoculation.

The skin of immunized animals shows neutralizing power when mixed with virus and injected. D. Harris

BRAZZAVILLE. AFRIQUE EQUATORIALE FRANÇAISE. RAPPORT SUR LE FONCTIONNEMENT DE L'INSTITUT PASTEUR DE BRAZZAVILLE PENDANT L'ANNÉE 1938 [SALEUN (G.)] pp 92-94 — Rickettsioses [Rickettsioses.]

This paper deals solely with a fatal disease among dogs in Brazzaville, this disease was characterized by fever nodules on the skin enlarged lymphatic glands convulsions and paralysis. Careful cultivations were made both during life and post mortem but without result. Smears from the organs of infected animals showed Rickettsia like bodies these also were seen in the tissues of guineapigs inoculated from sick animals. There was evidence that the virus was filterable dogs and guineapigs were infected with filtrates from the tissues of the sick animals. D. H.

BURNET (F. M.) FREEMAN (Mavis) DERRICK (E. H.) & SMITH (D. J. W.) The Search for Immunological Relationship between "Q" Fever and Other Rickettsioses.—*Med. J. Australia* 1939 July 8. 26th Year Vol. 2, No. 2. pp 51-54 With 1 fig. [10 refs.]

Emulsions of the Rickettsia of Q fever were tested for agglutination against a number of sera from human beings and from animals infected with a variety of Rickettsial diseases. Specimens of human sera of the following diseases were employed, endemic typhus from Queensland and from South Africa scrub typhus from Queensland and tick bite fever louse typhus and murine typhus of South Africa also Rocky Mountain fever all these tests were completely negative even in a dilution of 1/10. Specimens of serum of sheep infected with heartwater (S. Africa) and with a tick borne fever in Scotland also gave negative results. The morphology of the Rickettsia of Q fever was also found to differ from that of the organism found in the tick borne fever of sheep. Rabbits were inoculated with repeated doses of emulsion of the Q fever Rickettsia and a high titre of agglutination was produced but these sera did not agglutinate any strain of Proteus such as OX19 OX2 or OXA. It was also found that guineapigs which had been fully protected with doses of Rocky Mountain fever vaccine were not protected against inoculation of the virus of Q fever a similar series of tests was carried out by Dr DYER in America with a like result. Dr Dyer found in addition that guineapigs protected against virus of Q fever are also protected against the filter passing infectious agent isolated from Rocky Mountain wood ticks and also the sera of patients recovered from Q fever gave definite protection against the Montana virus thus indicating some relationship between Q fever and the infection obtained from wood ticks in Montana. [See this *Bulletin* 1939 Vol. 36 p 988.]

D. H.

PARKER (R. R.) KOHLS (Glen M.) COX (George W.) & DAVIS (Gordon E.) Observations on an Infectious Agent from *Amblyomma maculatum*.—*Public Health Rep* 1939 Aug 11 Vol. 54 No. 32 pp 1482-1484

A Rickettsia-like infectious agent mildly pathogenic for guineapigs has been recovered from ticks—*Amblyomma maculatum*—collected near Cleveland, Texas. As observed in male guineapigs there is usually a characteristic temperature curve with oedema and reddening of the scrotum, but the infection may be inapparent. There is complete cross immunity in guineapigs between this infection and both Rocky Mountain spotted fever and boutonneuse fever but with endemic typhus the degree of cross immunity is less consistent. However it agrees with none of these diseases in all particulars. D H

Cox (Herald R.) Studies of a Filter Passing Infectious Agent Isolated from Ticks. V. Further Attempts to cultivate in Cell-Free Media. Suggested Classification.—*Public Health Rep* 1939 Oct. 6 Vol. 54 No. 40 pp 1822-1827

Two types of media were employed in these further attempts to grow this filterable virus in cell-free media—

A. Noguchi *Leptospira* medium prepared with rabbit serum.

B. The same medium containing in addition 0.2 per cent. of each of the following sugars: glucose, lactose, sucrose, maltose and inulin.

The results of these experiments confirm the work previously reported indicating that the Rickettsia-like agent being studied cannot be cultivated and carried in serial passage in cell-free media commonly employed for cultivation of *Bartonella* but in culture tubes kept at 25°C. the virus survived for at least 100 days with no appreciable loss of infection titre.

Since the outstanding characteristic differentiating this agent from the known pathogenic Rickettsia is its property of filterability the name *Rickettsia diasporica* (a passer through) is suggested for it. [See also this Bulletin 1939 Vol. 36, p. 888] D H

MACCHIARELLO (Atilio) Sistematización del grupo Rickettsiae. [Systematic Description of the Rickettsia Group].—Reprinted from *Rev. Chilena de Hig. y Med. Preventiva* 1939. Vol. 1 pp. 297-330 [248 refs.]

MACCHIARELLO (Atilio) Estudios sobre hematología del tifo exantemático experimental. Hematología de ratas blancas normales. [Blood Changes in Experimental Typhus].—*Rev. Chilena de Hig. y Med. Preventiva* 1940 Mar Vol. 2 No. 1-3 pp. 53-63.

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67 1 large mononuclears 2 9 [stated in the article as 29 2 per cent clearly a mistake] coagulation time 3 minutes 12 seconds (average of 18 rats) H H S

IONESCO-MIHAIESTI (C.) CIUCA (M.) BALTEANU (I.) & COMBIESCO (D.)
Rapport de la commission sur l'épidémiologie et la prophylaxie
du typhus exanthématique [Report of the Commission on the
Epidemiology and Prophylaxis of Typhus.]—*Bull Acad Méd
Roumanie* 1939 4th Year Vol. 8 No 4 pp 421-435

In Bessarabia in 1936 there were 5 000 cases of typhus and in 1937 4 000 The cases commenced to appear in January and the peak occurred in March and April In 1938 there was a marked diminution in the number of cases in 1937 21 cases occurred in one week and in the same week in 1938 only 1 case was detected.

The campaign against the disease consisted in the detection and isolation of cases and mass delousing of the general population. Numerous personnel were employed and a continuous effort was made both winter and summer

Research—The writers consider that the endotoxin of *Proteus* is the factor responsible for the Weil Felix reaction as this antigen is closely related to the toxin of typhus. This endotoxin is highly toxic for man and animals (enterotropic) but it is not neutralized by the serum of typhus convalescents. D H

MARIANI (G.) Particularités épidémiologiques du typhus exanthématique sur le haut plateau Ethiopien [Epidemiology of Typhus in Ethiopia.]—*Bull Office Internat d'Hyg Publique* 1939 July Vol. 31 No 7 pp 1225-1232

A review of typhus in Abyssinia. The majority of cases are of the epidemic historic type and are louse-borne but other forms or types of typhus are met with but have not yet been identified. D H

MACCHIARELLO (Atílio) Estudios sobre tifo exantemático I—
Sobrevida y virulencia de los virus de los tifos Mejicano y Europeo congelados y desecados. [Typhus. I. Survival and Virulence of Mexican and European Types of Virus after Freezing and Drying.]—*Rev Chilena de Hig y Med Preventiva* 1937 Jan-Dec Vol 1 No 1 pp 63-68

The material employed was tissues—tunica vaginalis blood or brain—of guinea-pigs infected experimentally ground in a mortar with physiological saline then dried and frozen in accordance with Flosdorf and Mudd's method. For injection this was dissolved in saline and inoculated intraperitoneally The European variety could remain alive for at least 53 days and the Mexican for 79 days either could therefore be despatched for vaccination purposes H H S

MACCHIARELLO (Atílio) Estudios sobre tifo exantemático II—
Rickettsia prowazeki cuerpos de Mooser y virus tífico [Typhus. II. Rickettsia, Mooser Bodies and the Typhus Virus.]—*Rev Chilena de Hig y Med Preventiva* 1937 Jan-Dec. Vol. 1 No 1 pp 88-100 With 2 maps.

The author states that for years attempts have been made to prove that *R. prowazeki* is one of the forms of the virus of typhus but not the

most virulent others have maintained that the virus is ultramicroscopic invisible by dark ground, and not thrown down by high-speed centrifugation.

He finds that 5 000 r.p.m. for three hours will not throw down all the Rickettsia of murine origin or of the European form from the tunica vaginalis of infected guinea-pigs. The intensity of disease set up by inoculation he found to be directly related to the quantity of Rickettsia present. He does not think that there is an invisible form for when the centrifuging has been carried out for longer the Rickettsia disappear and the fluid does not cause the disease on injection. *H H S*

MACCHIARELLO (Attilio) Estudios sobre tífus exantemático. III.—Un nuevo método para teñir Rickettsia. [Typhus. III. A New Method of staining Rickettsia.]—*Rev Chilena de Hig y Med Preventiva* 1937 Jan.-Dec. Vol. 1 No. 1 pp. 101-106

The author claims that the following method of staining Rickettsia is more easy to carry out, takes less time, only 3-5 minutes and gives better results than those of Giemsa, Castaneda, Lepine, or Borrel.

A. Basic fuchsin. 0.025-0.1 gm.

Buffer solution at pH 7.4 or Aq. dest. 10 cc.

Mix and shake. Filter immediately before use must not be used when the supernatant fluid begins to lose its typical colour.

The preparation is dried either by gentle heat, or better in the air stained for 3-5 minutes—the shorter usually gives better results—letting the stain filter directly on to the slide. The buffer solution consists of a mixture of phosphates in distilled water and is kept at pH 7.4 diluted 1 in 3 for use.

B. Decolorize by 0.5 per cent citric acid solution, 1-3 seconds.

C. Contrast stain, 1-3 seconds with the ordinary methylene blue (methylene blue 1 gm., alcohol 10 aq. dest. 100 phenol 5) diluted 1 in 10.

The Rickettsia, intra- or extra-cellular are stained a bright red on a pale blue background. Very fine preparations, but less permanent, are obtained by substituting Victoria blue 1-2 per cent. for the methylene blue or thionin 2 per cent. or toluidin 1 per cent. Decoloration and contrast staining can be carried out at the same time by dissolving the counterstain in the citric acid solution. One drawback is that the fuchsin stain must be fresh and will probably have to be made up daily or even twice in a day. *H H S*

RAYNAL (J.) & FOURNIER (J.) Le typhus exanthématique de Chang Hai [Exanthematic Typhus at Shanghai.]—*Bull. Soc. Path. Exot* 1939 June 14. Vol. 32 No. 6 pp. 636-643 [14 refs.]

In the year 1938 there were over 1 000 cases of typhus fever in the four months March to June. The author believes that this was an epidemic caused by the murine virus and carried from man to man by the louse. *D H*

RAYNAL (J. H.) FOURNIER (J.) & VELLIOT (E.) Research on Typhus in Shanghai.—*Chinese Med J* 1939 July Vol. 56 No. 1 pp. 11-28. With 8 charts [15 refs.]

The author's conclusions are that

"The researches made on typhus fever in Shanghai lead to the conclusion that there exists under normal conditions a murine typhus, endemic in the rat and sporadic in man.

Owing to exceptionally favourable circumstances [overcrowding with starving and lice infested refugees] the spring cases of 1938 gave rise to a mild epidemic outbreak (a thousand cases out of a population of three millions) [This is by far the greatest number of cases recorded in Shanghai in one year since statistics are available]

The louse is manifestly the carrier of this epidemic murine typhus.

The strains of virus isolated from human cases nearly related experimentally to that from rats, can nevertheless, especially in one case be considered as intermediary types between rat virus and typical typhus virus.

This would seem to indicate that under certain conditions the rat virus escaping from the rat flea rat cycle can attempt an adaptation to the man louse-man cycle achieving *en route* various stages which mark its progress towards a historic typhus virus.

One of the authors (Raynal) states that he witnessed a similar epidemic in Guatemala (Tabardillo) and was struck by the analogies presented thereto by the Shanghai epidemic of 1938 D H

CLEAVE (T L) Two Cases of Typhus Fever—*Jl Roy Nav Med Serv* 1939 Oct Vol. 25 No 4 pp 418-421 With 3 charts.

Two cases of typhus admitted to Royal Naval Hospital Hong Kong are described, neither had contracted the disease locally. The first case was severe and was complicated by haemorrhage from the bowel and infarct of the spleen. The Weil Felix reaction was positive in both cases in the severe case *Proteus O119* was agglutinated in a dilution of 1/2800 and in the mild case to a dilution of 1/1400. In both cases guinea-pigs were inoculated with blood taken during the fever and gave a typical typhus reaction. D H

MASUCCI (U) La terapia del tifo esantematico [The Treatment of Exanthematic Typhus.]—*Arch Ital Sci Med Colon e Parassit* 1939 June. Vol. 20 No 6 pp 362-371

Instructions as to diet and oral hygiene are in conformity with common practice in fevers. Mention is made of Nicolle's serum which has been advised in the early stages but the results reported have not been very favourable. Convalescent serum may be used, preferably intraspinally in doses of 25 cc. Various metals have been tried but the author sums up these measures adversely and states that treatment is largely symptomatic. In prophylaxis the value of the vaccine of Weigl is appreciated.

For the toxæmia subcutaneous saline or glucose solution with 20-40 drops of 1/1000 adrenalin are advised to a total of 250-500 cc. daily. Tepid baths are used for hyperpyrexia. Strychnine sparteine and coramine are given as cardiac stimulants bromides for sedative purposes and in convalescence preparations of iron arsenic and glycerophosphates together with the vitamin-containing foods or products. C W

GIUNTA (Giuseppe) & D'IGNAZIO (Camillo) Su di una nuova terapia - del dermatifo [A New Treatment for Typhus.]—*Arch Ital Sci Med Colon e Parassit* 1939 June. Vol. 20 No 6 pp 372-374

In this short paper the authors repeat the main conclusions of the longer account already given of their method of treating typhus [see this *Bulletin* 1939 Vol. 36 p 989]

The haemorrhagic symptoms of the disease have points in common with scurvy the nervous symptoms with beriberi and in addition to symptomatic treatment and drug treatment with mercurochrome, the authors give vitamin C intravenously as ascorbic acid, and vitamin B. If the nervous system is affected, relieving pressure by lumbar puncture. No figures are quoted except that about 60 natives have been treated in this way in Addis Ababa, and the authors suggest a wide trial of their method. C 37

JOAQUIN INFANTE (Jorge) Reacción de Weil-Felix clínica en la campaña contra el tifo exantemático. [The Weil-Felix Reaction in an Antityphus Campaign.]—*Bolet. Oficina Sanitaria Panamericana* 1939 Dec., Vol. 18 No. 12, pp. 1134-1137 With 3 charts.

The author describes a rapid microtest called by him a "clinical reaction" for diagnosis of typhus. He obtains a drop of blood by finger prick and takes it up on filter paper. This he places on a slide and adds a drop of physiological saline. After about 5 minutes he removes the paper leaving the serum and agglutins. He then adds a small drop of antigen, *Protein U10* mixes the two and reads the result by naked eye.

During a period of 25 days (16th July-12th August, 1939) there were tested in this way 373 cases of fever and the results are compared with laboratory tests of the same patients. In 334 the findings were the same. 37 recorded as negative by the "clinical reaction" were returned as positive by the laboratory. This is explained by saying that the agglutination was low. 1 in 300 in the former and that the titre may rise rapidly so that by the time the laboratory tests were made it has risen to a diagnostic value. Two others are recorded as "temporarily disagreeing" these were found negative by the "clinical" test whereas the laboratory reported positive at 1/320. Some days later repetition of the former confirmed the laboratory findings. A third was reported as positive by one laboratory but was negative according to the author on two occasions. A fresh examination at the hospital laboratory confirmed the latter. One other was twice found positive by the author but negative at the laboratory. Death occurred and blood taken from the heart post-mortem when tested in the laboratory gave a strong positive. [The value of agglutination with blood taken after death needs confirmation. An analogy though not a parallel, was the experience of the reviewer. Blood taken at autopsy for carrying out the Wassermann reaction was tested by him in a large number of cases and invariably yielded a positive, though in life it might have given a negative finding.] It will be seen that no case found positive by the author's clinical test was returned as negative by the laboratory except the last and that was reversed subsequently.

H H S

LE RENARD (A.) & RAYNAUD (M.). Syndrome néphrotoxique suraigu du typhus exanthématique. Décapsulation du rein—guérison. [Decapsulation of the Kidney in Typhus Nephritis.]—*Arch. Méd. Gén. et Colon* 1939 Vol. 8, No. 3, pp. 77-83 With 4 diagrams.

A case of typhus with marked nervous symptoms caused by a toxic nephritis is described. There was complete suppression of urine and the patient became moribund. An emergency operation was

performed and the right kidney was decapsulated the flow of urine was re-established and the patient ultimately made a good recovery.

In the author's opinion the nervous symptoms coma etc in typhus are due in the majority of cases to a toxic nephritis. *D H*

REITLER (Rudolph) BYESH (Simon) & MARBERG (Kurt) Endemic Typhus in Palestine.—*Trans Roy Soc Trop Med & Hyg* 1939 July 28. Vol. 33 No 2. pp 197-212 With 1 chart [21 refs.]

This paper gives a short survey of the epidemiological data on endemic typhus in Palestine as far as they are known at present. The conclusion is drawn that endemic typhus is mainly a disease of the non-immunized immigrants while the indigenous population is assumed to be more or less "silently immunized" in childhood. The clinical picture of endemic typhus in Palestine is fully described and two types of the disease are distinguished. Their characteristic differences may be summarized as follows:—

	Type 1	Type 2.
Onset	Moderately severe	Very severe
Systemic reactions	"	Severe
Rash	Bright colour small spots confined to trunk.	Darker colour large spots. Spreads from trunk to limbs and face
Duration of disease	2-3 weeks.	10 to 12 days
Weil-Felix reaction	<i>Proteus</i> A 19	<i>Proteus</i> A 19
Date of appearance	6th to 12th day	12th to 14th day
Titre	High.	Low

D H

CASTANEDA (M Ruiz) & SILVA (Roberto) Varieties of Mexican Typhus Strains.—*Public Health Rep* 1939 July 21 Vol 54 No 29 pp 1337-1345 With 1 fig [14 refs.]

From October 1936 to January 1938 69 cases of typhus were admitted to the General Hospital of Mexico City. Of these 46 were bled for inoculation into rats these rats were later killed and emulsions of the brains inoculated into guinea-pigs. Thirty-eight such inoculations were made and produced 20 strains of typhus. Two of these strains showed the definite characteristics of murine strains. 8 were lost before definite diagnosis could be made, and the remaining 10 strains had all the characteristics of the European or historic epidemic virus yet none of these cases were imported, all were contracted locally. There was no epidemic of typhus during the period but from these cases taken as they came in three types of virus were isolated murine intermediate and epidemic. *D H*

RUGE (H.) Zur Frage des sogenannten Schiffsfleckenfiebers [The Question of So-called Ship Typhus].—Reprinted from *Deut Milit* 1939 Vol. 4 No 5 pp 224-227 With 4 figs. [16 refs.]

In 1933 an investigation in Hamburg showed that the sera of rats captured in the docks gave a positive Weil-Felix reaction and the emulsified brains of these rats infected guinea-pigs.

In 1937 a sailor from a ship in the harbour was admitted to hospital with fever—the fever was mild and a profuse rash was noted all over the body. The serum of the patient when first tested gave a positive reaction in a dilution of 1/200 with Bang's bacillus but later gave a strong positive reaction for *Proteus* OX2 although negative with *Proteus* OX19. Blood taken during the fever and injected into guinea pigs produced fever and orchitis and *Rickettsia* were seen in films made from the tunica vaginalis.

The author claims that this is the first case of ship typhus recorded in Germany. As the last port of call of the vessel was a Spanish Mediterranean port infected rats may have boarded the ship there.

D H

ROBERTS (J. I.) Notes on Typhus Fevers in Kenya.—*Jl Hygiene*. 1939 July Vol. 39 No. 4 pp 345-354. With 11 figs.

The author has already shown that there is a type of typhus fever in Kenya which resembles boutonneuse fever. A primary sore is present and the disease is carried from the dog to man by the dog tick *R. sanguineus*. In the case described in the paper the serum agglutinated *Proteus* OXA but not *Proteus* OX19.

There is also another type of typhus fever without primary sore and resembling endemic typhus which is carried by the rat flea from rat to man. Three cases are described and a murine typhus virus was isolated from rats and rat fleas captured in the brewery where the patients had been at work.

D H

MAISTER (M.) MILLER (A.) GEAR (James) DE MELLO (Botha) Murine Typhus in Natal. I. Report of Occurrence of Case [MAISTER & MILLER].—*South African Med Jl* 1939 Dec. 23. Vol. 13 No. 24 p 803. II. Laboratory Investigations [GEAR & DE MELLO].—*Ibid* pp 804-806. With 1 fig.

I. A young lady clerk employed in a rat infested grain store in Maritzburg developed fever with a profuse typhus rash. The Weil-Felix reaction became positive for *Proteus* OX19 to a dilution of 1/320 and *Proteus* OX2 1/200. Three years before a similar case had occurred in another employee of the same store and had been diagnosed as "flea-borne typhus".

II. (a) Rats were trapped in the store and killed and emulsion of the brains inoculated into guinea pigs. These animals developed fever and scrotal reaction and numerous *Rickettsia* were seen in smears from the tunica—these organisms were typical of the virus of endemic typhus.

(b) Fleas were collected from these rats and placed on a white rat. This animal was killed a fortnight later and emulsion of the brain was inoculated into a guinea pig which developed fever and a scrotal reaction. Similar *Rickettsia* were also seen in smears made from the inflamed tunica.

(c) Blood was obtained from another case of endemic typhus acquired in the same store, the blood clot was inoculated into a guinea pig and a strain of virus was isolated.

These three strains, from the rats in the store from fleas collected from these rats and from a patient who had contracted his infection in the store were tested and it was found that they were immunologically similar. This is the first occasion on which the virus of murine typhus has been isolated from a case of fever in Natal.

D H

- LIU (Wei Tung) & CHUNG (Huei Lan) I A Murine Typhus Virus Isolated from a Patient in Peking, China.—*Proc Soc Experim Biol & Med* 1939 Mar Vol. 40 No 3 pp 350-353 [15 refs.]

A typhus virus was recovered from the blood of a patient with typhus fever and this virus was found to conform to the murine type not only in its behaviour in the guineapig but also in the rat and in the mouse

D H

- LIU (Wei Tung) & CHUNG (Huei Lan) II. Typhus Virus Isolated from Rats and Rat Fleas in Typhus Houses.—*Proc. Soc Experim Biol & Med* 1939 Mar Vol. 40 No 3 pp. 353-355

Five strains of typhus virus were isolated from rats and their fleas caught in the houses of two typhus fever patients who were suspected on clinical and epidemiological grounds to be suffering from the immune variety of the disease

D H

- WOLFF (E. K.) A Strain of Tropical Typhus recovered from Rat Fleas.—*Ceylon Jl Sci* (Sect. D Med. Sci.) 1939 Sept. 4 Vol. 5 Pt. 2. pp 39-45 With 1 chart.

Rats were captured in the house of a man who had suffered from typhus fever fleas were removed from these rats and killed and emulsified 80 per cent of these fleas were *X asia* and 20 per cent. *A cheopis*. The emulsion was inoculated into 2 guineapigs one of these reacted with fever and typical scrotal reaction. This strain of virus was passaged to other guineapigs and to rabbits the serum of the rabbits agglutinated *Proteus OX19* to a titre of 1/300

D H

- PANG (K. H.) Distribution of Murine Typhus Rickettsiae in Developing Chick Embryo.—*Proc Soc Experim Biol & Med* 1939 May Vol 41 No 1 pp 148-150

Growth of murine typhus Rickettsia in Maitland culture was inoculated on to the chorio-allantoic membrane of fertilized eggs 10-12 days old They were incubated at 34°C. for 8-9 days and then cultures on Zinsser's "tissue agar" media and Maitland flasks were made from the various tissues and organs of the embryo Rickettsia were isolated from the focal lesion on the membrane and from all the visceral organs and the brain of the dying embryo Cultures from the liver gave the best results, those from the brain and membranes were poor

These results suggest that typhus Rickettsia of the murine type is able to produce a local lesion on the chorio-allantoic membrane as well as a generalized infection which often kills the embryo

D H

- CASTANEDA (M Ruiz) Experimental Pneumonia produced by Typhus Rickettsiae.—*Amer Jl Path.* 1939 July Vol. 15 No 4 pp 467-475 With 4 figs. on 1 plate

Mice and rats infected with an orchitic strain of typhus virus by the nasal route developed haemorrhagic lesions in the lungs and Rickettsia were seen in cells lining the bronchi. These resembled the Mooser

cells of infected rats. Rabbits were also inoculated with the tunica washings of infected guineapigs by the intratracheal route and showed the same lesions in the lungs. As a result of these pneumonic lesions mice die in 96 hours and rats and rabbits in 72 hours. No pneumococci were recovered from the lungs, the actual cause of the pneumonic condition was the Rickettsia. D H

WOLFF (J. W.) & DE GRAAF (W.) Een geval van shoptyphus (X19-Rickettsiose) met dierpassage van het virus. [A Case of Urban Typhus (*Proteus* X19-Rickettsiosis) with Animal Passage of the Virus.]—*Geneesk. Tijdschr. v. Nederl. Indië* 1939 Nov. 21 Vol. 79 No. 47 pp. 2985-2992. With 4 figs on 1 plate. English summary (3 lines)

Shop or urban typhus cases are not infrequent in Java and the patient's serum agglutinates the O form of *Proteus* X19. This reaction, so important for diagnosis, is apt to occur late in the disease when fever has subsided and the patient is convalescent. Attempts to transmit the disease by this time to animals are fruitless. Such animal passage can only be accomplished during the time when the temperature is raised. In the present case 4 guineapigs were inoculated intraperitoneally with 5 cc. of the patient's blood 9 days after his admission to hospital and 14 days from the beginning of symptoms. One of the guineapigs showed loss of weight 18 days after infection, fever on the 18th day (40-2°C.) and a weak scrotal reaction. Ten passages were made of the virus and the chief symptoms were rise of temperature after an incubation of 7 to 11 days and the simultaneous appearance of the scrotal reaction. This was much more invariably present than in experimental guineapig infection with *Proteus* XK virus. Similar scrotal reactions may be given by *Sp. muris* and the bacillus of melioidosis (*Pf. mallei*) but appear later than the beginning of fever and are much more intense and result in adhesion of skin and testicle. Film preparations to demonstrate Rickettsia were made from omentum, parietal peritoneum and tunica vaginalis. W. F. Harvey

BLANC (Georges), MARTIN (L. A.) & BALTARD (M.) Comportement du virus de typhus murin chez le pou de l'âne, *Haematopinus asini* (Lin.) [The Behaviour of Murine Typhus Virus in the Louse *H. asini*.]—*C. R. Acad. Sci.* 1939 Sept. 18. Vol. 209 No. 12 pp. 492-493

A donkey was infected by means of large intravenous doses of murine typhus virus. The animal developed fever and it was possible to infect guineapigs from its blood. Lice (*Haematopinus asini*) were removed from the donkey during the fever and were emulsified and inoculated into guineapigs which became infected with murine typhus. The lice were not virulent during the inoculation period but after the 10th day and up to the 20th day after the inoculation of the donkey, lice were capable of infecting guineapigs although the virus had disappeared from the blood of the donkey by the 10th day. Faeces of the lice were also found to be virulent for guineapigs. D H

BRAZZAVILLE ATRIQUE EQUATORIALE FRANÇAISE RAPPORT SUR LE
FONCTIONNEMENT DE L'INSTITUT PASTEUR DE BRAZZAVILLE
PENDANT L'ANNÉE 1938 [SALEUN (G)] pp 43-46 — Fièvres
exanthématiques [Exanthematic Fever]

The author describes a case of fever with a marked typhus-like rash and a primary sore. The serum agglutinated *Proteus* O₁₃ 2 in a dilution of 1/300 and *Proteus* O₁₃ 19 to 1/100 he considers that this case was one of boutonneuse fever. The patient owned a dog which was heavily infested with ticks and which slept in his room.

A monkey and guineapig were inoculated with the blood of the patient and showed evidence of infection fever and in the case of the monkey a rising titre of agglutination for *Proteus* O₁₃ 2 D H

MACVICAR (Neil) Tick-Bite Fever in Natives. [Correspondence]—
South African Med J 1939 Sept 23 Vol 13 No 18.
pp 691-692.

The author reports four native patients each of whom had a sore arising from a tick bite usually with a central black eschar with enlargement of the corresponding glands and fever but without rash. The fever apparently lasted a few days only and headache was present in all. The patients were seen at Lovedale. C H

GEAR (James) & DE MEILLON (B) The Common Dog Tick *Haemaphysalis leachi* as a Vector of Tick Typhus.—*South African Med J*
1939 Dec. 23 Vol. 13 No 24 pp 815-816. With 2 figs.

Cases of tick bite fever have continued to be met with in the Witwatersrand in people associated with tick infested dogs. On at least three occasions ticks *H. leachi* removed from these dogs when inoculated into guineapigs have produced fever and scrotal reaction this strain of virus was successfully established and transmitted for several generations. In smears made from the tunica of the infected guineapigs *Rickettsia* similar in morphology and cytoplasmic distribution to those of tick bite fever were observed. Cross immunity experiments proved this strain to be immunologically similar to strains isolated from human cases. Experiments have now been carried out which show that *H. leachi* the dog tick is capable of transmitting the infection while biting and feeding. The ticks were collected from a dog belonging to a patient who was suffering from tick bite fever these ticks were allowed to feed on a guineapig to which they remained attached for 3 days on the 4th day the guineapig developed fever and small primary sores developed at the sites of the bites and the inguinal glands became enlarged and tender. In smears made from the tunica vaginalis of the infected guineapigs *Rickettsia* were observed which resembled the *Rickettsia* of tick bite fever and in some cells the organisms were observed within the nucleus. Guineapigs recovered from infection with the virus of tick bite fever were immune to inoculation with this strain and *vice versa*. On the other hand guineapigs recovered from infection with this virus were not protected against typhus virus nor did infection with typhus virus (endemic or epidemic) protect guineapigs from this virus of tick bite fever [see also this *Bulletin* 1939 Vol. 36 pp 996-997] D H

MORISHITA (Kaoru) Further Notes on the Epidemiology of Tsutsugamushi Disease in Formosa.—*Tanshen Igakki Zasshi* (Jl. Med Assoc Formosa) 1939 Oct. Vol. 33, No 10 [In Japanese pp. 1471-1484 English summary p. 1484]

The number of cases of fever noted during the period 1933-38 was 166. As regards seasonal prevalence the peak was in July. Among these cases 107 were Japanese, 44 Formosan Chinese and 10 aborigines. There were 133 males and 23 females. There was a 12 per cent. case mortality over all and among the Chinese cases the mortality was 20.4 per cent. and in the Japanese 10.3 per cent. D H

JOLLY (A.) & DI RUGGIERO. Sur un cas de fièvre typho-exanthématique observé à la Guadeloupe. [A Case of Typhus in Guadeloupe.]—*Bull Soc. Path. Exot.* 1939 July 12. Vol. 32. No 7 pp. 703-706.

A severe case of a fever of the typhus group with a marked rash which involved the hands and feet but not the face. The Weil-Felix reaction was positive in a dilution of 1/2500 for *Proteus OXA*. There was no primary sore. D H

LE COSQUINO DE BUSBY (Ivonne J) & VAN LOGHEM (J J) \ (Rickettsia) componenten in Nederlandsche stammen van *Proteus vulgaris* en *Proteus anindologenes*. [X (Rickettsia) Components of *P. vulgaris* and *P. anindologenes*.]—*Nederl Tijdschr v Geneesk* 1939 Dec. 30 Vol. 83. No 82 pp 6012-6019 English summary (10 lines)

"The authors have agglutinated 19 strains of *Proteus vulgaris* (indologenes) and 33 strains of *Proteus anindologenes*, grown in Holland from noses of patients with osena, from faeces, etc., against sera of shop-typhus and scrub-typhus originally from Sumatra. These strains with shop-typhus sera gave only negative or weak reactions (not over 1:250) but with scrub-typhus sera the results varied from negative to dilutions 1:10 000, which is a support for the hypothesis that in every *Proteus* strain an X component is inherent. A remarkable finding was the positive reaction (in one up to 1:10 000) of two indologenic strains with scrub-typhus serum.

"In absorption tests by the method of Castellani the strongly agglutinated strains withdrew the Rickettsia-agglutinins completely from the scrub-typhus sera."

LAIGRET (Jean) & DURAND (Roger) La vaccination contre le typhus exanthématique. Nouvelle technique de préparation du vaccin emploi des cerveaux de souris. [Mouse Brain in the Preparation of Typhus Vaccine.]—*Bull Acad Méd* 1939 July 11 103rd Year 3rd Ser Vol. 122. No 28 pp. 84-89

The vaccine used previously by the writers was a dried virus prepared from the brain of infected guinea-pigs and englobed in yolk of egg.

It has been found that it is not possible to titrate the dose of virus in such a vaccine. It has now been found that if mice instead of guinea-pigs are employed the dose of virus can be directly measured and the virus stabilized or fixed as is the virus in yellow fever.

If the virus is passaged from brain to brain in mice the virulence is much increased and paralysis is produced in the mice, but for purposes

of vaccine preparation brain peritoneum passage is utilized and a titrated brain vaccine with the virulence always equal and controlled can be produced. This virus can be kept for 85 days in the refrigerator and for at least 7 days at room temperature. Seven thousand people have now been successfully vaccinated with the mouse brain vaccine as a rule it is only possible to give one dose of vaccine but 3 doses should be given when possible

D H

LAIGRET (J.) & DURAND (R.) La vaccination contre le typhus exanthématique en Tunisie. Modifications apportées à la technique de préparation et d'inoculation du vaccin [Technique employed in Vaccination against Exanthematic Typhus in Tunis.]—*Bull Soc Path Exot* 1939 July 12, Vol. 32, No 7 pp 735-751

The typhus vaccine previously used by the authors in Tunisia was prepared from the brains of rats and of guineapigs infected with murine typhus virus. Although this vaccine has been used on a large scale and successfully the great drawback has been that the amount and the degree of virulence of the virus in the dose of vaccine could not be accurately measured. The authors have found that if mice are inoculated intraperitoneally from rats and the murine virus is passaged intracerebrally in the mice the virus produces paralysis and death in a definite period of time and a fixed virus can be obtained comparable with that of yellow fever. The procedure is now to inoculate the mice intraperitoneally and to employ the brains of these animals in the place of guineapig or rat brains in the production of vaccine. The amount of the virus in the mouse brain can be accurately titrated by injection into series of mice the minimal amount capable of producing paralysis being taken as the unit of virulence. It has been found that one brain will contain from 1 000 to 10 000 units and one brain yields 1 000 doses of vaccine.

In the preparation of the vaccine the mouse brain is emulsified in 40 cc. of yolk of egg. It is then dried and kept in the refrigerator while being tested for virulence and later suspended in distilled water for inoculation. This vaccine retains its virulence in the refrigerator for three months and at room temperature at least one week. Seven thousand vaccinations have already been carried out with the new vaccine the great advantage of which is that the amount and virulence of the virus in a dose of vaccine can now be accurately titrated.

D H

SPARROW (Hélène) Abondance des rickettsias du typhus murin cultivées dans les poux. [Abundant Growth of Murine Rickettsia in the Louse.]—*Rev d'Immunologie* Paris, 1939 Sept. Vol. 5 No 5 pp 462-468 With 6 charts

Lice were infected by the anal route with the virus of murine typhus Tunis No 1. Very heavy growths were obtained in the lice and the intestines were emulsified and diluted to high titres so that minimal doses could be injected intraperitoneally into rats and guineapigs from 1/1000th of an intestine to 10 000 millionth. The latter dose was capable of producing infection as shown by fever and scrotal reactions and by the production of a solid immunity

D H

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If the virus is passaged from brain to brain in mice the virulence is much increased and paralysis is produced in the mice but for purposes

of vaccine preparation brain peritoneum passage is utilized and a titrated brain vaccine with the virulence always equal and controlled can be produced. This virus can be kept for 95 days in the refrigerator and for at least 7 days at room temperature. Seven thousand people have now been successfully vaccinated with the mouse brain vaccine as a rule it is only possible to give one dose of vaccine but 3 doses should be given when possible. *D H*

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In the preparation of the vaccine the mouse brain is emulsified in 40 cc. of yolk of egg. It is then dried and kept in the refrigerator while being tested for virulence and later suspended in distilled water for inoculation. This vaccine retains its virulence in the refrigerator for three months and at room temperature at least one week. Seven thousand vaccinations have already been carried out with the new vaccine the great advantage of which is that the amount and virulence of the virus in a dose of vaccine can now be accurately titrated. *D H*

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SPARROW (Hélène) & MARESCHAL (Pierre) Réaction de l'organisme humain à l'inoculation des rickettsias du virus typhique murin I de Tunis. [Human Reaction to Murine Rickettsia Inoculation.—*Rev d'Immunologie* Paris. 1939 Sept. Vol. 5 No. 5. pp 469-475 With 8 charts.

The authors repeated their previous experiments of inoculation and instillation of the virus of typhus murine Tunis No. 1 into human beings but on this occasion, however employed as inoculum the intestinal contents of infected lice in place of emulsions of brain of infected guinea pigs and rats.

When instilled into the conjunctiva of a mental patient a dose consisting of the contents of the intestine of one infected louse produced a mild fever which lasted about a week there were no other symptoms of any kind but the Weil-Felix reaction became positive and a solid immunity was produced. Similar results were obtained when the subcutaneous route was employed but there was a marked difference in the severity of the disease in fact a typical case of typhus resulted. However this could be minimized by regulation of the size of the dose.

The authors insist that if it is intended to produce immunity by means of injection of living virus it is necessary to produce an infection although this infection may only be demonstrated by a rise in the titre of the Weil-Felix reaction. The authors also affirm that laboratory animals and particularly the rat are more sensitive to the murine virus than is man.

D H

PICKERTON (Henry) & BESSEY (Otto A.) The Loss of Resistance to Murine Typhus Infection resulting from Riboflavin Deficiency in Rats.—*Science* 1939 Apr 21 N.S. Vol. 89 No 2312. pp 368-370

Five rats which had been fed on a diet deficient in riboflavin were injected with typhus virus all of them died and at post-mortem a profuse peritoneal exudate was found and the cells in the exudate contained masses of Rickettsia.

Two rats fed on a diet deficient in vitamin A were also injected but did not die and only slight exudate was found on examination. The former method might prove useful in obtaining material for vaccines.

D H

COX (Herald R.) Rocky Mountain Spotted Fever Protective Value for Guinea Pigs of Vaccine prepared from Rickettsiae cultivated in Embryonic Chick Thymus.—*Public Health Rep* 1939 June 16. Vol 54. No 24 pp. 1070-1077

An emulsion was made of the infected embryonic tissue in saline and the virus was killed by the addition of carbolic acid 0.4 per cent. and formalin 0.1 per cent. The emulsion was then centrifuged and the supernatant fluid used as a vaccine. It was found possible to prepare 1,000 cc. of vaccine from two 10 day old embryos. A single 1 cc. injection of the vaccine was sufficient to protect a guinea pig from a test dose of a virulent strain of the Rocky Mountain fever virus.

D H

BLANC (Georges) & BALTAZARD (Marcel) Recherches sur la durée de l'immunité conférée à l'homme par l'infection fébrile ou inapparente de typhus murin [The Duration of Immunity due to Febrile or Inapparent Infection with Murine Typhus].—*C R Acad Sci* 1939 Aug 28, Vol. 209 No 9 pp 419-420

Conclusions 1 An attack of murine typhus with fever gives regularly a perfect immunity against murine typhus and also against epidemic typhus for at least 5 years

2. An inapparent infection with murine typhus produced by bile treated vaccine or otherwise gives also an immunity of the same value and duration.

3 It is possible to conclude that even if every person inoculated with bile treated vaccine is not immunized certainly all those who have had an inapparent infection following vaccination are immunized and for a considerable period—4 or 5 years. For this reason if vaccination is regularly performed in endemic areas the infection ought to disappear rapidly The authors quote cases in support of their conclusions.

D H

KAWAMURA (R) KASAHARA (S) TOYAMA (T) NISHINARITA (F) & TSUBAKI (S) On the Prevention of Tsutsugamushi. Results of Preventive Inoculations for People in the Endemic Region, and Laboratory Tests with the Pescadores Strain.—*Kitasato Arch Experim Med* 1939 May Vol 16 No 2, pp 93-109

The Pescadores strain of tsutsugamushi fever was passaged in the testicles of rabbits for 181 generations the inoculation of testicular mulsions produced only mild fever in man.

Thirty-one volunteers were inoculated all showed well marked local reaction and mild fever with the exception of one man who had had tsutsugamushi fever previously he did not react in any way

The majority of these persons afterwards worked daily in the endemic area and none contracted fever although they were actually bitten by akamushi and cases of fever occurred among the unprotected injections of the Pescadores virus immunized mice against the virulent Nigata strain. The authors are convinced that the Pescadores strain may be used for general preventive measures against tsutsugamushi fever in the endemic regions [see also this *Bulletin* 1939 Vol. 36 p 1000]

D H

KAWAMURA (Rihya) & UEDA (Morinaga) On the Treatment of General Paresis with the Pescadores Strain of Tsutsugamushi Virus.—*Kitasato Arch Experim Med* 1939 Sept. Vol. 16 No 3 pp 183-196 [18 refs.] [Summary appears also in *Bulletin of Hygiene*]

In contrast to Japanese tsutsugamushi fever or Japanese river fever which has a mortality of 30 to 50 per cent the Pescadores strain is safe as in 113 cases inoculated with it there was no serious event The authors present in this paper evidence that inoculation with Pescadores tsutsugamushi has distinct advantages over malarial inoculation in the treatment of G P I

The original virus for the present research was obtained from a patient's blood and subsequently subinoculated into rabbits testicles

from the 6th to the 12th day. After several subcultures the parasites could be grown on the surface of chocolate agar colonies appearing after 48 hours incubation. The organisms when stained appeared as minute ovoid cocci and clusters of delicate rods on chocolate agar at 37°C they appear as wavy threads. They are non-motile and Gram negative. Three-weeks-old rats were found to be non-infected and when these were inoculated with culture materials they developed anaemia and adult rats treated with arsenobenzol to remove infection and then inoculated with culture developed severe anaemia. Complement fixation tests with cultures and sera of rats were positive.

Emulsions of *Rickettsia* were agglutinated by sera of rats and rabbits which had been immunized with *Bartonella* cultures also a positive Weil-Felix reaction was obtained in rats and rabbits. D Harvey

TYZZER (Ernest Edward) & WEIDMAN (David) *Haemobartonella* n. g. (*Bartonella* olim Pro Parte) *H. microti* n. sp., of the Field Vole, *Microtus pennsylvanicus*.—*Amer J Hyg* 1939 Nov Vol. 30 No. 3 Sect. B pp 141-157 With 2 text figs. & 10 figs. on 1 plate. [28 refs.]

In an earlier paper Tyzzer has described 7 different types of blood parasites in the common field vole. These included trypanosomes, haemogregarines, Babesia, Bartonella and Grahamella-like parasites.

From a large sample of voles locally captured Bartonella infection was demonstrated after splenectomy in practically every single animal.

These parasites were extremely polymorphic and slender rods, coarse filaments, ring forms and corroid bodies were all seen. It might be argued that some of these forms represented other parasites of the vole such as Eperythrozoon but when the blood of the infected vole was inoculated into splenectomized white mice the same forms of the Bartonella appeared.

In view of the polymorphism of this parasite it is proposed that this is a new species and should receive the name of *Haemobartonella microti*. It is also suggested that the genus Bartonella should be divided into two Bartonella and Haemobartonella—(1) Bartonella type species bacilliformis the cause of Oroya fever which multiplies within cells other than blood cells such as venous endothelium and which produces wart like or nodular skin eruptions. (2) Haemobartonella new species, applying the name to those Bartonella in which there is no demonstrable multiplication outside the blood and which does not produce cutaneous eruptions. *Haemobartonella microti* was readily cultivated on Noguchi's semi-solid serum agar. D H

JARAMILLO (Radil) Contribución al estudio de la bartonelosis en Colombia (Enfermedad de Carrión.) [Carrión's Disease in Colombia].—*Rev de Hig* Bogotá 1939 Aug. Vol. 20 No. 8 pp 13-70 With 10 charts & 5 figs. [73 refs.]

This is a thesis for the local doctorate of medicine. It reviews the subject of human bartonelosis with brief details of 23 cases observed personally by the author. Except that it states the parts of Colombia in which the disease has been found to occur there is no fresh information beyond what is given in text-books dealing with Oroya fever and verruga peruana. H H S

WAKIL (A W) & HILALI (F) The Dengue Epidemic of 1937 in Cairo.—*Jl Egyptian Med Assoc* 1938 Nov Vol. 21 No 11 pp 716-737 With 4 charts. [28 refs.]

This epidemic of dengue has already been referred to in this *Bulletin* 1939 Vol. 36 p 482.

Two thousand five hundred and ninety four cases were reported in 1937-38 and 92 per cent. of these occurred in the city of Cairo. The writers are of opinion that the infection was not imported into Egypt but that the epidemic arose from missed sporadic cases in September owing to the long interval since the last epidemic in 1928 there were many susceptible people.

There was no undue prevalence of *Aedes aegypti* in Cairo during the autumn of 1937 but this mosquito was readily found in houses where cases were occurring. An intensive anti mosquito campaign was carried out in the city by means of anti-mosquito brigades. D H

GERGAWY (Iskandar F) The Epidemics of Dengue Fever in Egypt in 1927-1928 and 1937.—*Jl Egyptian Med Assoc*, 1938. Dec. Vol. 21 No 12, pp 796-812 With 9 charts.

Cases in the epidemic of 1928 are compared with cases seen in the epidemic of 1937. Charts and clinical notes are given for 3 cases in 1928 and 6 in 1937. Little difference is noted. D H

MADRAS REPORT OF THE KING INSTITUTE GULNDY FOR THE YEAR ENDING 30TH SEPTEMBER, 1938 [SHORTT (H. E.) Director] pp 38-39—VI. The Filterable Viruses Enquiry [PANDIT (C. G.) & SHORTT (H. E.)]

The dengue fever virus has already been cultivated in this laboratory on chorio-allantoic membrane. A small outbreak of the disease in St. Thomas Mount provided an opportunity for further study of the virus. The virus was found to persist in the blood for 40 days during convalescence. The presence of neutralizing bodies was also demonstrated. It was also found that the dengue fever convalescent sera did not neutralize the sandfly fever virus. D H

LE GAC (P) & SERVANT (J) Contribution à l'étude de la ponction lombaire et des modifications du liquide céphalo-rachidien au cours de la dengue. [The Spinal Fluid in Dengue].—*Bull Soc Path Exot* 1939 Nov 8. Vol 32 No 9 pp 888-893 With 1 fig

In cases of dengue hypertension of the cerebrospinal fluid is the cause of severe and intractable headache stiffness of the neck pain in the back and slow pulse. This headache is as a rule not relieved by drugs which are useful in other diseases. On lumbar puncture clear fluid under considerable pressure flows out and this gives immediate relief to the symptoms mentioned above. There is also less weakness after the fever in cases so treated and in 3 or 4 days after the fever patients can resume their work. As regards the fluid itself examination shows that there is some increase in the albumen content (not so great as in sandfly fever) considerable increase in sugar content no increase in chlorides and no marked cellular reaction. D H

MADRAS REPORT OF THE KING INSTITUTE, GUINDY FOR THE YEAR ENDING 30TH SEPTEMBER, 1938 [SHORTT (H. E.) Director]. pp. 31-32.—III. Further Observations on the Virus of Sandfly Fever [PANDIT (C. G.) RAO (R. S.) & SHORTT (H. E.)].

During the year over 150 samples of sera collected during the febrile and convalescent stages from cases of sandfly fever were studied for their virus content. It was noted by the egg inoculation technique that the virus was present in the blood regularly for 7 days. The virus is now at its 64th passage on the chorio-allantoic membrane. It was found that this cultivated virus was non-pathogenic for monkeys and other laboratory animals, it was decided therefore to use it as a vaccine for human volunteers. Eight volunteers received the vaccine in 2 doses at an interval of 1 week. 8 others were treated with normal saline as controls—no untoward results followed and the presence of the virus in the sera of the volunteers was demonstrated. Later both the control and the test volunteers were inoculated with pooled sera from cases of sandfly which had previously been tested for presence of virus.

Results.—Out of 6 test volunteers 3 escaped infection, 2 had a mild attack and 1 had a typical attack. Out of 7 in the control group 2 had typical attacks and 5 escaped infection. The attacks in the control group were much more severe than in the inoculated group. D H

ANDERSON (W. M. E.) Observations on *P. papatasi* in the Peshawar District. Part I.—*Indian J. Med. Res.* 1939 Oct Vol 27 No. 2 pp 537-548. [10 refs.]

The author presents the results of an investigation on sandflies (*Phlebotomus papatasi*) at Peshawar N.W.F. in the hot weather of 1938. It appears that the adult insects were abundant from the end of March to the end of October. A considerable number of generations must have been produced for the insects passed through a complete cycle in one month in the laboratory in the hot weather and even in September and October the cycle only occupied two months. The adults appear to be equally abundant on the upper and lower floors of a two-storey bungalow as was shown by hand catching and trapping at light. A somewhat primitive wind tunnel was constructed, and observations made with it seem to show that the insect could make headway against a wind up to 1.6 miles per hour.

An attempt was made to control the insect by applying naphthalene dissolved in cheap kerosene to certain spots in the soil. Forty gallons of this, at a cost of 1 rupee per gallon, were used to treat an area within 120 yards of an isolated building. The author could get no evidence that this had reduced the number of sandflies or of cases of sandfly fever. [This appears to suggest that in the present state of knowledge it would pay to devote attention to the exact determination of breeding places, making use of modern methods for extracting insects from considerable samples of soil. One might then concentrate more precisely on breeding places and measure the effectiveness of treatment by counting the larvae in soil before and after the applications.] The author also sprayed a barrack room with 5 per cent. lethane 334 this produced a great reduction in the number of flies as much as 4 days later though it was not determined to what extent this was due to the repellent and to the toxic actions of the insecticide.

[It is not clear from the text how many identifications were made by the tedious but precise method of examining microscopic characters nor whether other large species superficially resembling *P. papatasi* occurred in the area.]
P A Buxton

LE GAC (P) SAMARA (M) & SERVANT (J) Nouvelle contribution à l'étude des modifications du liquide céphalo-rachidien au cours de la fièvre à pappataci Hypertension méningée. Réaction de Guillain. [New Contribution to the Study of the Modifications of the Cerebrospinal Fluid in the Course of Sandfly Fever]—*Bull Soc Path Exot* 1939 May 10 Vol 32. No 5 pp 473-477 With 3 figs.

The fluid is clear but under very considerable pressure. The albumen content is always very high in contrast with the few lymphocytes seen. In the reaction of Guillain tubes 5 6 7 and 8 show benzoin colloidal precipitation without any modification of the other tubes [see this *Bulletin* 1939 Vol 36 p 253 for the colloidal benzoin reaction]

D H

PIRUMOV (Kh. N) & AWANJAN (S. A) Results of an Attempt of Immunization from Sand-Fly Fever—*Med Parasit & Parasitic Dis Moscow* 1939 Vol. 8 No 2. [In Russian pp 235-241 English summary p 242.]

The virus employed was the blood of patients with sandfly fever this was mixed with the serum of convalescents from the disease and injected. 230 persons were treated in this way and the percentage subsequently infected in this group during the epidemic season was 27 whereas in one untreated control group 84 per cent. contracted the disease.

D H

CHOLERA.

PRÉCIS OF ABSTRACTS IN THIS SECTION

PASRICHA *et al* (p 276) have studied the serological behaviour of 438 vibrios from cases of cholera. AHUJA and SINGH (p 277) record their experiments with 219 strains of vibrios from cases of cholera healthy persons and from water all inagglutinable by anticholera O serum which show that the H or flagellar antigen is non-specific in contrast with the O or somatic antigen. VENKATRAMAN (p 277) shows that vibrios isolated from natural water in the Madras Presidency and from the stools of residents of Madura city (which had been free from cholera for a year) were in no case agglutinable by Group 1 (O) serum of Gardner and Venkatraman.

SOPARKAR (p 277) found *V. cholerae* in the faecal and vomit spots of a large proportion of house flies during the first 8 hours after ingestion, but only occasionally up to 24 hours.

SEAL (p 278) gives a modification of the Wilson and Blair medium which is an improvement on alkaline peptone water for the isolation of *V. cholerae*. CHATTERJEE (p 278) shows that in cultures of *V. cholerae* histidine is transformed completely into histamine changes in

the tissues of cholera patients resemble those produced by histamine. DE ALMEIDA (p. 278) discusses colony morphology in relation to agglutination of cholera and El Tor vibrios.

ALBERTS (p. 279) gives details of the factors which influence the result of the test for haemolysis by vibrios. The test should be strictly standardized.

DE MOOR (p. 279) considers that the recent epidemic in S. Celebes, where the mortality was 63 per cent. was undoubtedly due to the El Tor vibrio. He points out that this vibrio may be more pathogenic than is usually thought and that its relatively weak haemolytic power when freshly isolated may have led previous workers to regard it as true *V. cholerae*. GRISER (p. 280) also regards the Celebes strain as identical with the El Tor vibrio. In addition to differences in haemolytic power and the results of the Voges-Proskauer reaction he describes the effect of heating to 58°C. for 3 hours, which renders *V. cholerae* inagglutinable by anticholera serum but has no effect on the El Tor vibrio. TAKITA (p. 281) obtained a powerful exotoxin from 5 of 10 strains of the El Tor vibrio and notes that it differs from the haemolysin.

SOLARINO (p. 281) records experiments in rabbits which prove that the cholera vibrio can pass to the intestine by the blood stream after absorption from the fauces and that it can pass directly through the stomach, resisting the acidity on into the intestine.

CHATTERJEE (p. 282) finding no evidence of real obstruction to the flow of bile in cholera, considers that the stasis observed may be the result of a nervous action. He suggests that the symptoms of cholera may be due to allergy. The *Calcutta Medical Journal* (p. 282) however inclines to the view that they are due to specific toxins elaborated in the intestinal wall.

HUGHES (p. 282) describes the effective emergency hospitals in Shanghai which deal with cholera in refugees. Treatment is essentially a simple massive normal saline infusion at the rate of over 2 litres an hour continued until the pulse is reasonably good and the temperature rise approaches normal. Reactions are common but the mortality is only 7 per cent. C IV

TOMES (J. Walker). A Study on the Epidemiology of Cholera.—*J. Trop. Med. & Hyg.* 1939 Aug 15 Vol 42 No. 16 pp 261-252

A study of the mortality from cholera in the endemic area of the mining settlement of Asansol situated in the province of Bengal during the years 1918-28 has shown it to be, for the month of March—in non-epidemic years—very constantly one-thirteenth of the total annual mortality. This finding may prove a reliable basis for the calculation of the probable total deaths in any given year.

W. F. Hervey

PARNICHA (C. L.) LATHI (M. N.) DAS (P. C.) & PAUL (B. M.) The Serological Types of Vibrios Isolated from Cholera Patients in Calcutta.—*Indian Med. Gaz.* 1939 Nov Vol. 74 No. 11 pp. 690-681

The authors have studied a large number of vibrios isolated from 859 clinical cases of cholera during 1939. Altogether 438 vibrios were

obtained for examination. Their serological type was determined by means of rabbit sera prepared from dried Inaba and Ogawa O antigens. In the 438 bacterially positive cholera cases 60.7 per cent. of the vibrios were of Inaba O- 25.8 per cent. Ogawa O- 2.8 per cent. Inaba HO-agglutinable vibrios and 10.7 per cent. were not agglutinable with any of the three sera.

W F H

AHUJA (M L) & SINGH (Gurkirpal) Observations on the "H" Antigen of Vibrios.—*Indian Jl Med Res* 1939 Oct Vol. 27 No 2. pp 287-295

Cholera H or flagellar antigen is non-specific by contrast with the somatic or O antigen. This fact is also expressed by saying that there is considerable serological overlapping in respect of the H antigen amongst vibrio strains isolated from cholera and non-cholera sources. In the present study 219 strains of vibrios non-agglutinated by O serum and comprising 56 strains from cholera cases 35 strains from healthy persons and 128 strains from water were investigated in respect of their H antigen chiefly with an HO Inaba cholera serum. Two types of test suspension were used (1) formalized agar washings with opacity equal to 2 000 million vibrios per cc. and (2) chloroform extracts with opacity of 4 000 million per cc. The latter gave the greater number of positive results namely 42.9 60 and 56.5 per cent. for case, carrier and water strains respectively. The result taken over the whole 219 vibrios shows that 35.5 per cent. possess H antigen partially or completely identical with that of *V. cholerae* and this general statement was borne out by the use of cross-absorption tests carried out with pure H sera prepared against 10 strains of varied origin but agglutinable with HO cholera serum. Strains not agglutinated by HO cholera serum formed a heterogeneous group some of them showing partial H relationship amongst themselves but the majority possessing individual H antigens.

W F H

MADRAS REPORT OF THE KING INSTITUTE GUINDY FOR THE YEAR ENDING 30TH SEPTEMBER, 1938 [SHORTT (H. E.) Director] pp 27-29 29-31 —I. Cholera Enquiry [VENKATRAMAN (h. V)] II. Cholera (Fly) Transmission Enquiry [SOPARKAR (M B)]

I. The cholera enquiry was directed to the determination of types of vibrio isolated under varying conditions and from varying sources. In certain districts where outbreaks of cholera of ordinary severity had occurred the vibrios as usual, were of Inaba type but in other districts in which there were only sporadic cases of cholera, the vibrios isolated were also of Inaba type although in previous years they had been of Ogawa type. Was this change associated with low incidence or only accidental? An enquiry is to be made to determine this point.

Vibrios were isolated from natural sources of water. None of these agglutinated with group 1 O serum [presumably this refers to Group 1 Gardner and Venkatraman of which Inaba is a subtype] while their distribution in HEIBERG's scheme of groups I II III IV V VI and VIa was 113 139 2 2 17 10 and 17 respectively. In Madura city which had been free of cholera for the whole year no vibrios agglutinable by group 1 O serum were isolated from the stools of 6,301 residents.

II. Experiments to determine how long the cholera vibrio remains viable in the housefly after ingestion gave only 2 out of 60 positive

[April, 1940]

details of 48 cases are recorded here. Doubt arose as to its cholera nature however when the causal vibrio was found to be one which caused haemolysis of sheep erythrocytes in nutrient bouillon after 24 hours incubation. The conjunction of a haemolytic vibrio with true epidemic cholera, having a mortality rate of 85 per cent. was a new event. It could only be an El Tor vibrio as was shown by its cultural and serological characters, but El Tor vibrios, in spite of their close relationship to cholera vibrios, are practically non-pathogenic. A comprehensive survey is made in this article, of the whole El Tor question and a very good summary is made of the various contributions to that controversy which began in 1905 and still continues. This El Tor vibrio belongs to Gardner and Venkatraman's subgroup O 1 to Heiberg's type I to the Ogawa serological strain and is haemolytic to goat cells. The epidemic caused by it was over in six months and did not occur again. The identity of the organism does not seem to be in doubt but the author asks whether considering the weakness of the haemolytic power of the vibrio when freshly isolated, it is not possible that in previous instances El Tor vibrios may have caused epidemics and been simply ranked as true cholera vibrios. (See also this Bulletin 1839 Vol. 36 p. 374)

IV F H

h. This is an English version of the same paper
 GISEN (R) Les différences entre le vibron El Tor et le vibron
 cholérique (Differentiation of the El Tor and Cholera Vibrios).—
Ann Inst Pasteur 1939 Sept. Vol. 63. No. 3 pp 283-301
 [16 refs.]

The specific relationships of cholera, El Tor and Celebes vibrios are considered together. Examination of two of the Celebes (Macassar) strains confirmed that they are identical with the specific El Tor vibrio. El Tor agglutinable vibrios are possessed of an exohaemolysin for goat's blood in bouillon, while cholera vibrios show under the same circumstances only an endohaemolysin [see also this Bulletin 1839 Vol. 36 p. 373]. It has been shown also that both cholera and El Tor vibrios possess the same polysaccharide but cholera possesses protein I and El Tor protein II. An examination of 81 strains of cholera and 31 strains of El Tor for the Voges-Proskauer reaction gave 78 cholera strains negative and 23 El Tor positive [see also this Bulletin 1839 Vol. 36 p. 372]. So far it seems that haemolysis of goat's blood in bouillon and the Voges-Proskauer reaction are the only practical means by which the two vibrios can be distinguished. A third testing reaction, the reaction to heat is described in this work.—Cholera vibrios in saline suspension are rendered inagglutinable by heating at 58°C for 3 hours that is to say the suspension is no longer rendered clear by the anticholera serum. An El Tor suspension, on the other hand, is not affected in its agglutinability. Celebes vibrios behave like the El Tor vibrios. A temperature of 60°C is necessary to destroy the agglutinability of these two latter vibrios. The conclusion is reached that "in general characters and chemical structure the El Tor vibrio occupies a position intermediate between the cholera vibrio and non-agglutinable vibrios" and that the two vibrios although identical in antigenic structure, do represent different species [see also this Bulletin 1839 Vol. 36 pp. 374-375].

IV F H

TAJITA (Jungo) Preparation of Toxin and Antitoxin of El Tor Cholera
Vibrio—*Kaisato Arch Experim Med* 1939 Sept. Vol. 16
 No 3 pp 218-236

Experiments were conducted with 10 strains of El Tor vibrios on the production of toxin and antitoxin. Five strains gave a powerful and specific exotoxin killing laboratory animals rapidly by intravenous injection. This lethal toxin differs from the haemolysin although with few exceptions it is produced by haemolytic strains only. The optimum conditions for production of a potent toxin are the adjustment of bouillon culture surface and volume to a ratio 4.7 or 5* and incubation for 2 to 7 days. Intravenous minimum lethal doses with death in 24 hours were 0.01 cc per kilogram weight in mice and 0.25 cc in rabbits while intraperitoneal and subcutaneous doses were 25 times and 50 times greater respectively. Toxoid with antigenic property could be produced from the toxin by the action of 0.05 per cent formalin or 0.1 per cent sodium ricinoleate at 37°C for 24 hours and 1 hour respectively. It was shown that fresh sera of animals will neutralize the toxin but that this power was lost by heating at 56°C. for 30 minutes whereas the specific immune serum might be heated for 30 minutes at 60°C without loss of power. II F H

SOLARINO (Giuseppe) Sulla patogenesi del colera. Contributo alla conoscenza dell'evoluzione del colera sperimentale nel coniglio [Experimental Cholera in Young Rabbits].—*Giorn di Batteriol e Immunol* 1939 July Vol. 23 No 1 pp 1-16 [21 refs]
 English summary

Thirteen rabbits were used, 10 sucklings of 4 to 9 days old 2 adolescents and 1 adult and the experiments were designed to test (1) the possibility of passage of vibrios by the lymphatic and blood stream to the intestine and (2) their ability to pass the barrier of the acid stomach into the intestine. In the former series of experiments the cholera vibrios were deposited from 24 hour cultures on the buccopharyngeal mucosa after division of the oesophagus and ligature of the two ends thus precluding direct entry into the stomach. In the second series of experiments a gastrotomy was carried out and vibrios introduced directly into the stomach, by which the pharyngeal lymphatic blood circulation route was excluded. The results of these experiments have shown that the contention of SANARELLI for passage of vibrios by absorption from mouth and pharynx and transmission to the intestine without traversing the stomach is confirmed. Perhaps it is more interesting in the second set of experiments to have evidence that—contrary to general opinion—vibrios can resist the acidity of the stomach and pass thence into the intestine. The conclusion from these experimental studies would seem to be that vibrios can pass to the intestine by the blood stream after absorption from the fauces and also that they can pass directly through the stomach on into the intestine [see also this *Bulletin* 1939 Vol. 36 p 898] IV F H

* Sic The directions are —“A flask having a diameter at the bottom of 10 cm. an inclination of the wall of 30 or 40 degrees and a capacity of 270 cc. was used in this, 15 cc. of the bouillon was placed. This makes the ratio of the surface area in sq. cm. to the volume in cc. about 5:1

describe the condition of the blood in 113 patients with malaria. ROY (p. 291) describes an unusual case.

MARILL *et al* (p. 291) have obtained, in malarial splenomegaly good results with intravenous injections of quinine, quinacrine and praquine in successive courses each of 5 days in one week, the whole being repeated 3 times. DIXON (p. 292) discusses the concentration of atebria in the blood and tissues. He (p. 292) shows that when given in normal doses neither atebria nor plasmoquine passes through the placenta.

GENEVRA *et al* (p. 293) record successful drug prophylaxis with premaline administered once each week to a community in Tonking, but for permanent improvement anti-mosquito measures are essential.

NICHOLAS (p. 293) describes a simple automatic sluice. MURRAY (p. 294) recounts the findings in his work on the spreading power of larvicide oils. JURCHAK and BORHENKO (p. 295) use a suspension of Paris green in water with naphtha or petroleum, and find it more effective and cheaper than dust mixtures. LA FACE (p. 295) reports that *A. m. typicus* and *A. m. labranchei* are still found in an area of bonification in Italy.

C IV

FEDERATED MALAY STATES. ANNUAL REPORT OF THE MALARIA ADVISORY BOARD FOR THE YEAR 1938 (KINGSBURY (A. Neave) Chairman) —22 pp. With 4 charts. 1939 Kuala Lumpur Govt. Press. [31 or 2s 4d.]

The numbers of admissions to government and estate hospitals obviously give but an imperfect idea of malaria incidence. As far as they go they indicate a greatly increased incidence of malaria during 1937 the number of cases treated was 51,300 as compared with 35,500 in 1937 and 27,200 in 1938. In all four States the incidence curve reached its height in May. Extensive replanting of rubber offering as it does increased facilities for *Anopheles* breeding, is believed to have been an important factor in determining increased malaria prevalence. Nine cases of blackwater fever were reported as compared with seven in the previous year. The case mortality rate, for the F.M.S. as a whole, fell from 2.2 to 1.8 per cent.

Reference is made to observations on the value of prontosil as a remedy for malaria [see this Bulletin 1939 Vol. 36, p. 399]. Further experiments were carried out as to the relative efficiency of various anti-larval oils. It was found that the addition of pyrethrum to the more active larvicidal oils that are recommended resulted in larvae dying more rapidly but the number that eventually died was not increased the addition does not serve any useful purpose. Experiments with calves showed that anti-malarial oil is not harmful to cattle.

In one area fascine drainage, for which rubber tree branches were used, is still functioning well after six years.

Other matters of interest referred to in the Report have been published in the literature and duly noted in this Bulletin.

Norman White

BISPHAM (W. V.) Malaria in the Southern States.—*Southern Med J* 1939 Aug. Vol. 32 No. 8. pp. 848-851

Malaria in eight Southern States is a notifiable disease but notification is very incomplete. In one county where special efforts were made to

get physicians to report cases the number so reported rose from 351 to 1 414 in another county from 38 in 1936 to 212 in 1937. In the last few years 30 000 school-children have been examined in the southern States the parasite index ranged from 4 to 9. Among Civilian Conservation Corps enrollees there was a parasite index of 9. On the basis of these observations it is probable that the number of infected persons in the area is no less than 1 600 000. Only some one hundred thousand cases are reported annually. The examination of school children showed that *P. falciparum* infections varied from zero to 80 per cent average 35. *P. malariae* is very rarely found.

The elimination of malaria from this area is a stupendous task. Past efforts at prevention have been abortive. The need for systematic work based on the results of complete malaria surveys is stressed. The problem of prevention of malaria in the Southern States is important.

N IV

RAFFAELE (G) Sulla struttura dei gameti maschili dei plasmodidi [Structure of Male Gametes of Plasmodium].—*Riv di Malarologia* Sez. I 1939 Vol 18 No 3 pp 141-152. With 3 figs. & 1 coloured plate [12 refs.] English summary

In the formation of male gametes from the microgametocytes of malarial parasites the author finds that the first thing to happen is the extrusion of a gamete-producing body which contains most of the chromatin. Finally this body may separate from a residual mass in which most of the pigment and some chromatin remains. The residual body may make some abortive attempt to produce gametes but if any are produced they are not capable of fertilization. The gametes proper are formed by the gamete-producing mass of cytoplasm which extrudes at first a cytoplasmic filament or flagellum to which becomes attached the actual fertilizing process containing the chromatin. The mature male gamete consists of a chromatin-containing tapering filament, to the anterior end of which is attached a long flagellum which is generally more or less adherent to the filament throughout its length. In structure therefore the male gametes resemble closely the male gametes of coccidia as first described by SCHAUDINN for *Eimeria schubergi*.

C M Wenyon

JERACE (Felice) Raro reperto ematico e parassitario nella malaria umana. [Unusual Blood Picture and Stage of Parasite in Human Malaria].—*Riv di Malarologia* Sez. I 1939 Vol 18. No 3 pp 153-158. With 1 coloured plate. [13 refs.] English summary (5 lines)

In a blood film from a case of malaria the author found a mixed infection of *Plasmodium falciparum* and *P. malariae*. The various abnormalities in the red and white corpuscles are enumerated, while what appears to the author to be a non-pigmented schizont in a normoblast is described and figured in a coloured plate. He discusses this parasite in relation to the erythrocytic schizonts seen so commonly in bird malaria and certain forms described as non-pigmented schizonts in human malaria by RAFFAELE [see this *Bulletin* 1938, Vol. 35 p 514] and TARBITANO and LUCREZI, but it appears to the reviewer that these forms from man are too indefinite to be compared with the very characteristic and distinct reproducing forms from birds.

C M IV

MAYNE (Bruce) Graphical Reproduction of the Life Cycle of the Malaria Parasite in the Mosquito Host.—*Nat. Inst. Health Bull. No. 170* Washington (continuation of Hyg. Lab. Bull. Series) 1938. June. 15 pp. With 27 plates (3 coloured)

This is a clear and full, yet concise, account of the life cycle of the malaria parasite. The admirable microphotographs contribute much to its value. It will be invaluable to the student. N IV

ZVIAGINTSEV (S. N.) Contribution au problème de la faculté sélective des femelles anophèles lors de la ponte et le sort des œufs pondus dans des collections d'eau de salinité diverse. [Selective Faculty of Female Anopheles for Waters of Varying Salinity for Egg Laying, and the Fate of Eggs laid therein].—*Méd. Parasit. & Parasitic Dis.* Moscow 1939 Vol. 8. No. 2. [In Russian pp. 181-189 With 2 figs. French summary p. 189]

Earthenware vessels were inserted up to their rims in the floor of an insectarium measuring 6 by 3 by 3 metres, and were filled with NaCl solutions of various dilutions and with fresh water as a control. Large numbers of *A. maculipennis maculipennis* and *A. m. sacharovi* females were kept in the insectarium in as natural conditions as possible. In a preliminary experiment nine dilutions of NaCl from 0.25 to 3 per cent. and fresh water were used. This experiment showed that factors other than the salinity of the water also influenced the choice of water for egg laying, such as the proximity of the vessel to the walls and corners of the insectarium, and the distance of the vessel from the sheltering place. In the crucial experiment the position of the vessels was changed each day. In this experiment dilutions of from 0.25 to 1.75 per cent. were used.

The number of egg-layings by *A. m. sacharovi* decreased with the increase of the salinity of the water from 0 to 1.75 per cent. *A. m. maculipennis* showed no great preference either for fresh water or salt water up to a concentration of 1.5 per cent. In the concentration of 1.75 per cent. however the number of layings was much less. Some eggs were laid by both species in all concentrations, even up to 3 per cent.

Increasing concentrations of NaCl exercise an unfavourable influence on the viability of the eggs. Eggs which hatch out in concentrations of from 2 to 3 per cent. produce larvae which perish before reaching the second stage. N IV

JOURNÉ (Ch.) SICRÉ (A.) & SAUTET (J.) Note préliminaire sur l'anophélisme au Soudan français. [Anophelism in the French Sudan, Preliminary Note].—*Bull. Soc. Path. Exot.* 1939 June 14 Vol. 32. No. 6. pp. 616-617

Collections of anophelines were made in all parts of the French Sudan during the rainy seasons, July to October of 1937 and 1938. The following species were found: *A. gambiae*, *A. fuscus*, *A. constanti*, *A. nili*, *A. pharoensis*, *A. rufipes* and *A. squamosus*. *A. gambiae* and *A. fuscus* were found throughout the territory the former enormously predominating. The other species were almost confined to areas irrigated from the Niger and where malaria is particularly severe. *A. gambiae*, *A. pharoensis* and *A. constanti* were all numerous in these areas. The geographical distribution of the species, the nature of their breeding places and their relation to malaria will be considered in a future report. N IV

DUREN (A.) *Clef des anophèles du Congo belge* [Key to the Anopheles of the Belgian Congo].—*Ann Soc Belge de Méd Trop* 1939 June 30 Vol 19 No. 2. pp 161-191 With 12 figs.

WALLACE (R. B.) *Resting Places of Anophelines on an Inland Hilly Estate.*—*Jl Malaya Branch Brit Med Assoc* 1939 June Vol 3 No 1 pp 33-40 With 4 charts.

In an inland hilly estate in Malaya at the beginning of May 1938 there was a human population of about 3 250 and 554 cattle. Routine catching of Anopheles has been carried out once a week for 12 years past in the coolie lines and in the cattle sheds of all six divisions of this estate. In May 1938 all cattle were removed from the estate. The effect this had on the catches of Anopheles during the four subsequent months is illustrated by charts on which the monthly catches of the different species are compared with the catches of the corresponding months of the previous year. The majority of *A. maculatus* were always caught in coolie lines. Small numbers only were caught in cattle-sheds. After the removal of the cattle there was a slight increase in the coolie line catches but this increase may have been due to other causes. In Java this species is much more attracted by cattle than it is in this part of Malaya. *A. larvae* prefers cattle sheds, as do *A. philippinensis*, *A. hyrcanus*, *A. kochi* and *A. vagus*. *A. aconitus* was caught only in small numbers. *A. hyrcanus* practically disappeared after the removal of the cattle though this species has been described by other authors as markedly anthropophilic. N W

WALLACE (R. B.) *The Range of Flight of Anopheles maculatus.*—*Jl Malaya Branch Brit Med Assoc* 1939 June Vol. 3 No. 1 pp 22-32. With 1 chart & 3 figs.

Anti-larval measures confined to the half mile and even the three-quarter mile radius frequently fail to prevent seasonal waves of malaria in areas where *A. maculatus* breeding is intense. This was the chief reason that prompted the experiments described. Three areas were chosen for experiment the most suitable being rubber land surrounded on three sides by high hills of virgin jungle the fourth side is open and contains the coolie lines. There are no human habitations between the lines and the jungle the intervening space being planted with mature rubber. Mosquitoes were collected for about a week. These were sprayed with painter's gold dust and then liberated at various distances from the coolie lines. Thereafter for several nights two trained catchers collected adult mosquitoes in the coolie lines. The results of eight such experiments are tabulated. Only a small proportion of the liberated *A. maculatus* was recaptured but it was proved that mosquitoes can fly a distance of one and three-eighths miles in search of food. N W

ANDRÉ (M.) & TOUMANOFF (C.) *Etude sur le paludisme et la faune anophéllienne dans le centre d'estivage du Mont Bavi.* [Study of Malaria and Anopheline Fauna in the Hill Station of Mount Bavi].—*Rev Méd Française d'Extrême-Orient* 1939 Apr Vol. 17 No 4 pp 415-428 With 1 fig & 1 plan

This paper describes the creation of a military hot weather resort on a spur of mount Bavi, not far from Hanoi. Its altitude is 600 metres.

There were numerous cases of malaria during the first season 1937. Most if not all of these were relapses and during the last two summers malaria has been much less in evidence. It is doubtful whether malaria has been acquired locally. When the station was installed but two anophelines could be found there, *A. atkinsoni* and *A. maculatus*. Since then other anophelines have made their appearance *A. hyrcanus* var *sincensis* and var *nigerimus*, *A. fuliginosus*, *A. maculipalpis*, *A. lesselatus*, *A. aconitus* and *A. pyropusensis*. These species have hitherto only been found in the adult stage in horse stables; their larvae have not been found. This increase in the anopheline fauna, due apparently to the growing traffic, indicates the necessity of limiting possible breeding places to a strict minimum and the treatment of gamete carriers before they are sent to the hill station. N IV

TOUMAXOFF (C.) Observations sur la fécondité et la longévité de *A. hyrcanus* var *sincensis* Wied. [Fecundity and Longevity of *A. hyrcanus* var *sincensis*.]—*Bull. Soc. Path. Exot.* 1939 July 12. Vol. 32. No. 7 pp. 729-730. With 1 fig.

Females of *A. hyrcanus* var *sincensis* in Tonking in summer can lay 6 or 7 batches of eggs totalling, in two cases observed, 881 and 607 eggs, respectively. In winter most females only laid a single batch of eggs and that after a long period of functional debility during which repeated blood meals were taken. At the end of winter one female laid four batches of eggs but the total number of eggs laid was only 303. Females in winter live longer than they do in summer. In summer the length of life was from 5 to 8 weeks during which time numerous batches of eggs were laid. In winter semi-debilitated females have been kept alive as long as 18 weeks. Female mosquitoes raised in the laboratory in summer and winter respectively thus have a length of life varying inversely with their fecundity. N IV

CHANG (T. L.) Mosquitoes of HUNAN PROVINCE with Special Reference to *Anopheles*.—*Chinese Med. J.* 1939 July Vol. 58 No. 1 pp. 53-63. [19 refs.]

BOYD (Mark F.) & EARLE (Walter C.) On the Susceptibility of a Neotropical *Anopheles pseudopunctipennis* Theobald, 1901 to Neartic and Neotropical Strains of *Plasmodium falciparum*.—*Amer. J. Trop. Med.* 1939 July Vol. 19 No. 4 pp. 405-408.

A report by Boyd, Carr & ROXBOROUGH on the relative susceptibility of nearctic and neotropical anophelines to strains of malaria from the same regions has already appeared [see this *Bulletin* 1938 Vol. 35 pp. 659-660]. In this further extension of that work the authors compare *A. pseudopunctipennis* from highlands in the State of Morelos, Mexico with a Florida strain of *A. quadrimaculatus* with regard to the susceptibility to strains of *P. falciparum* from the same regions. Their observations show that *A. pseudopunctipennis* is much inferior to *A. quadrimaculatus* in its susceptibility to either strain; that even in its own habitat it is probably a very inefficient vector of *P. falciparum* and that *A. quadrimaculatus* is more susceptible to the Mexican strain than to the Floridan strain of *P. falciparum*. Some proportion of all the lots of *A. quadrimaculatus* became infected on every application to either strain; only one lot of *A. pseudopunctipennis* in each series developed infection and then only in a low degree. N IV

HINMAN (E. Harold) Recent Advances in Entomological Knowledge of Malaria Control Report of the Subcommittee on Entomology—*Southern Med J* 1939 Aug Vol. 32. No. 8. pp 857-862. [43 refs.]

FARINAUD (E) & PROST (P) Recherches sur les modalités de l'impaludation en milieu Moï et en milieu Annamite [Malaria Infections in Populations of Annamites and Moïs Contrasted].—*Bull Soc Path Exot* 1939 July 12. Vol. 32. No 7 pp 762-769 With 3 figs.

In the intensely malarious high plateaux of south Indo-China one is struck by the contrast in the appearance of the often athletic looking Moïs and the sickly Annamite population of more or less recent importation. The difference is ascribed to the more solid immunity to malaria developed by the adult Moïs population. The results of the inquiry which was destined to throw light on the causes of this marked difference in the reaction of the two races to malaria are best summarized by reproducing two tables from the report —

Moïs 1 000 children and 1,219 adults examined

	Age						
	0-6 months	6-12 months	1-2 years	2-5	5-10	10-15	Adults
Spleen index	73.3	83.2	88.1	96.6	84.0	83.2	18.5
Parasite index	71.6	86.6	96.3	92.8	75.9	60.1	26.6
Gamete index	20.0	40.6	41.6	33.5	18.8	15.9	5.3

Annamites living under similar conditions 712 children and 344 adults

Spleen index	57.0	31.4	53.8	62.8	59.0	61.0
Parasite index	38.1	41.6	37.8	35.7	41.4	18.6

Among the Moïs population all infants are infected. The infant mortality rate is high 30 per cent. All three forms of Plasmodia are present in adults only *P. falciparum* is found splenomegaly decreases as age advances. The high percentage of gamete carriers among young children is noteworthy.

Among the Annamites the splenic index increases throughout childhood and is high among adults. The adult Annamite remains an invalid the Moïs become tolerant of their infections. N IV

SHUTE (P. G.) Protracted Incubation Periods in Indigenous Cases of Malaria in England.—*Jl Trop Med & Hyg* 1939 July 15 Vol. 42. No 14 pp 201-204 With 1 chart.

Two cases of naturally acquired *P. vivax* malaria in England with protracted incubation periods are reported.

The author directs attention to the interesting fact that the interval between the initial attack and the first late relapse in naturally induced *P. vivax* malaria approximates closely the length of protracted incubation periods. The study of which the results are recorded concerns a Rumanian strain of *P. vivax*. Of 145 patients infected by mosquitoes,

52 relapsed. Of these one relapsed two months after the primary inoculation, one after three months, and the remainder between six months and one year the average interval being 263 days. Of the nine cases of protracted incubation periods observed with the same strain the average length of that period was 282 days. It was further noted that if a large dose of atabrin be given immediately after the infective bite of the mosquito the febrile attack will commonly not develop till six to nine months later such cases behave as cases with protracted incubation periods. Of 19 such cases, 10 per cent. developed the attack between the second and seventh months 85 per cent. between the eighth and twelfth months, and 5 per cent. during the thirteenth month. The average interval was 263 days. These patients were infected at all seasons of the year.

The author considers it possible that latent infections are due to the inoculation of restricted numbers of healthy sporozoites. The Rumanian strain produced fewer gametocytes than a tropical strain and the mosquitoes infected had fewer oocysts. The number of sporozoites injected would be fewer than in the case of the tropical strain. Latency was more often observed with the Rumanian than with the tropical strain.

N IV

NIKOLAJEV (B. P.) Sur la durée et la marche de l'infection paludique chez l'homme (The Duration and Course of Malaria Infection in Man.)—*Méd Parasit. & Parasit. Des* Moscow 1939 Vol. 8, No. 2 [In Russian pp 191-204 With 1 chart. [17 refs.] French summary pp. 204-206]

This paper records the results of seven years observations in Leningrad on 11,347 cases of naturally acquired malaria and 200 cases of experimental benign tertian malaria transmitted by mosquitoes. The patients were in conditions which precluded the possibility of repeated infection. The naturally acquired infections were all recent the probable dates of infection being ascertainable with sufficient accuracy. *P. vivax* infections numbered 9,484 of which 5,220 had protracted incubation periods. *P. falciparum* 719. *P. malariae* 310 and mixed infections 854. Of the 200 cases of induced malaria 43 had protracted incubation periods, from 254 to 360 days.

The duration of malaria infections is limited the longest duration of *P. vivax* infections from the time of infection is 27 months and of *P. falciparum* infections 20 months. There is no reason to believe that either of these parasites can survive in the human host for indefinite periods. The number of *P. malariae* cases was more limited certain infections with this species persisted from three to four years.

Each species of parasite is characterized by its own period of primary manifestations and its own periodicity of relapses. If *P. vivax* infections have short incubation periods relapses often occur during the first two or three months following infection. Thereafter in a number of cases infection remains latent, with small tendency to relapse for four or five months. From the 8th to the 13th month after infection relapses are frequent and persistent. Relapses are most frequent from the 8th to the 10th month. After this relapses become invariably less frequent and two years after infection convalescence is complete in the majority of cases. In *P. vivax* infections with prolonged incubation periods the four to six months following the first clinical manifestations of the disease are the period in which relapses are most intense, that is

from the 10th to the 15th month after infection after this relapses invariably become less frequent

In *P. falciparum* infections relapses occur regularly during the four to six months following infection thereafter there is a marked decline in the number of relapses. There is a gradual diminution in the severity of each successive relapse

In *P. malariae* infections relapses occur during the eight to ten months following infection most are experienced during the first six months. Thereafter relapses become slowly but constantly less frequent. During the first year relapses occur at relatively short intervals afterwards they occur at intervals from 12 to 18 months.

Experience with induced malaria shows that prevalent ideas regarding the influence of season on the course of malaria infections have no foundation. N IV

LIVADAS (G) CANELLAKIS (A) & VALAORAS (V G) Some Observations on the Haematological Picture in Malaria.—*Riv di Malariologia* Sez I 1939 Vol. 18 No 3 pp 159-165

The observations recorded concern 113 patients suffering from malaria in the village of Vovoda situated on a hill some 500 metres above the sea near the north coast of the Peloponnese. All the patients had fever and parasites in the blood the blood examinations were made before the commencement of treatment. Malaria is endemic in Vovoda but when the observations were made transmission was unusually low most of the cases were probably relapses. The species of *Plasmodium* found were *mx* 82, *falciparum* 20, *malariae* 9 and mixed 2. Qualitative alteration of red cells was rarely observed. Red cells numbered less than $3\frac{1}{2}$ million in just over a quarter of the cases and between $3\frac{1}{2}$ and $4\frac{1}{2}$ million in just over a half. In three-quarters of the cases haemoglobin varied between 60 and 80 per cent. only 13 per cent. had a lower haemoglobin content. The number of platelets was diminished in almost all cases. Most cases showed a leucopenia leucocytosis was observed in a few cases during the access. The leucocytic type was lymphocytosis or lymphocytosis combined with monocytosis. Neutrophilia was not observed. Haemoglobin was most diminished in *malariae* infections leucopenia was most marked in *falciparum* infections. N IV

ROY (Sudhir Chandra) An Unusual Case of Subtertian Malaria.—*Indian Med Gaz* 1939 Aug Vol. 74 No 8 pp 478-479

A case of subtertian malaria the onset of which was accompanied by aphasia the temperature rose to 105.8°F on the first day. On the following day there was paralysis of the right leg and paresis of the right arm. On the third day there was severe haemorrhage from the bowels. Quinine was administered the patient recovered. N IV

MARILL (F) GUILY (P) & KESSIS (R.) Chimiothérapie intraveineuse au cours du paludisme chronique. (Note préliminaire.) [Intravenous Chemotherapy of Chronic Malaria].—*Bull Soc Path Exot* 1939 June 14 Vol. 32 No 6 pp 600-602.

Many cases of excessive splenomegaly presumably caused by malaria in many of which it is impossible to find the malaria parasite are more

or less refractory to anti-malarial medication by mouth. The authors have systematically treated all such patients by intravenous medication. Their type treatment is as follows. First week, five injections, on successive days, each of 1 gm of dihydrochloride of quinine. Second week, five daily injections each of 0.30 gm. of quinacrine. Third week, five daily injections each of 0.03 gm. of praequina. This procedure is repeated thrice nine weeks treatment in all. Out of 120 patients 55 completed the full nine weeks course the remainder left before it was completed. The results of the treatment will be given in a subsequent communication. It is stated that they have been superior to results obtained by oral or intramuscular medication. In all 739 intravenous injections of quinine, 1 023 of quinacrine, and 727 of praequina have been given without any serious incident. The quinine is diluted in 100 cc. of glucose serum and injected slowly the injection taking about 20 minutes. The quinacrine is dissolved in 10 cc. of distilled water and injected slowly from a syringe, in 2 to 3 minutes. Praequina is administered in the same manner as is quinacrine but the injection may be slightly more rapid.

N IV

BOMBAY REPORT OF THE HAPPELLE INSTITUTE FOR THE YEAR 1938
[SOKHEY (S. S.) Director]—Concentration of Atebrin in the Blood and Tissues [DIKSHIT] p. 47

Atebrin diffuses very rapidly into the tissues concentration is greatest in the spleen, liver and lungs. After oral administration the concentration is highest in the liver after intravenous injection the lungs contain as high a concentration. After oral or parenteral administration, of varying doses the concentration of atebrin in the blood rapidly reaches a level of about 1/300 000 and remains at that level for some time. If atebrin be continuously infused into the vein of an experimental animal the heart continues beating till a concentration of about 1/80 000 in the coronary circulation is reached.

N IV

BOMBAY REPORT OF THE HAPPELLE INSTITUTE FOR THE YEAR 1938
[SOKHEY (S. S.) Director]—Effect of Plasmoquine and Atebrin on the Foetus [DIKSHIT] p. 48.

Experiments to demonstrate the filtration of plasmoquine by the placenta were made by recording the movements of the foetal diaphragm. The respiratory centre of the foetus is very sensitive to the action of plasmoquine when very small quantities of the drug are introduced directly into the foetus. When the drug is introduced into the maternal circulation no action on the foetal respiration could be observed. Similar experiments were made with atebrin which, in therapeutic doses, was also filtered out by the placenta. When doses of atebrin far in excess of therapeutic doses were given to the mother evidence of the appearance of the drug in the foetal circulation was obtained.

N IV

LINCOLN (F. M.) Experience with Synthetic Drugs in the Treatment of Malaria.—*Proc. Roy. Soc. Med.* 1939 July Vol. 32. No. 9 pp. 1082-1088 (United Services Sect. pp. 24-29)

SIVALINGAM (V.) Malarial Fevers and their Treatment.—*Jl Ceylon Branch Brit. Med. Assoc.* 1939 May Vol. 38. No. 3. pp. 157-180 With 6 charts.

THOMAS (René) Introduction et culture des quinquinas au Congo belge et spécialement au Kivu Création d'une plantation de cinchona Ledgeriana [Cultivation of Cinchona in the Belgian Congo].—*Bruxelles Méd* 1939 Aug 20 & 27 Vol 19 Nos 42 & 43 pp 1300-1307 1332-1339 With 7 figs.

GENEVRAJ (J) TOUMANOFF (C.) & TRY (H T) Essai de prophylaxie du paludisme par la prémaline dans une localité du Tonkin et son effet sur le degré d'infection naturelle du vecteur majeur (*A. minimus* Theob) [Malaria Prophylaxis with Premaline in Tonking and its Effect on the Natural Infection of the Chief Vector, *A. minimus*].—*Rev Méd Française d'Extrême-Orient* 1939 Apr Vol. 17 No 4 pp 397-414 With 1 fig [37 refs.]

This experiment in premaline prophylaxis was carried out in a coffee plantation in the province of Ninh Binh the malaria problems of which have been described by the authors in a previous publication [see this *Bulletin* 1939 Vol. 36 pp 131-132] The coolies and their families numbering 71 individuals in all are housed in 6 groups of houses. These houses harbour very numerous *A. minimus* the chief vector. No other antimalaria measures have been undertaken. The incidence of malaria was very high. There are no stables in the near vicinity of the houses. Persons living in a near-by village acted as controls. Before the experiment began the spleen parasite and gamete indices of children in the treated group were 85.7, 71.4 and 28.5 and of adults 51.5, 39.4 and 9.0 per cent. respectively. Premaline was the only drug used. A tablet of premaline contains quinacrine 0.10 gm. praequine and rhodoquine of each 0.005 gm. The dose for adults and children above 12 was 3 tablets for infants below the age of one it was half a tablet. For six months these doses were given once a week during the succeeding six months they were given every 10 days. The results are described in detail. The weekly administration reduced the spleen rates of children and adults to 25 and 21 the parasite rate of children was brought rapidly to and maintained at zero. No case of malaria occurred during these six months and the general health was markedly improved. The administration of the drug at ten-day intervals was insufficient in less than a month cases of malaria began to occur. The drug was well tolerated.

The administration of premaline did diminish the infection rate of mosquitoes but at the end of the experiment the infection rate of *A. minimus* was 2.58 per cent. which indicates severe endemicity. For any permanent improvement antimosquito measures and prophylactic medication will be necessary. N IV

NICHOLAS (W. A.) A Four-Day Automatic Sluice.—*Jl Malaya Branch Brit Med Assoc* 1939 June. Vol. 3 No 1 pp 44-46 With 1 plan

This is a clear description of a simple and effective automatic sluice that is easy and inexpensive to construct. A reservoir 40 feet long, 5 feet wide and 4 feet deep is separated by a 9-inch concrete wall from a small reservoir 28×14×40 inches. A half-inch pipe traverses the wall and connects the two reservoirs an adjustable cock on this half inch pipe regulates the rate at which the small reservoir is filled. A six inch inverted U syphon leads from the large reservoir to the outfall the small reservoir is provided with a half inch inverted

U syphon. A half-inch pipe connects the U-bends of the two syphons. When the small reservoir is sufficiently full to overcome the air seal in the small syphon the water syphons off and in so doing unlocks the air-seal in the U-bend of the large syphon and the sluice comes into operation. The effective length of sluicing for a reservoir of the size described is about 600 yards of a water-course 4 feet wide. A II

BLACKLOCK (D. B.) Notes on Siphon Action, with Special Reference to Anti-Mosquito Work.—*Ann. Trop. Med. & Parasit.* 1939 July 20. Vol. 33. No. 2 pp. 141-160 With 8 figs.

This paper discusses the functions of siphons, their applicability to mosquito control, and their possibilities. Laboratory experiments, with very simple apparatus, are described which furnish useful information as to the manner in which the difficulties experienced in obtaining efficient automatic siphonage may be overcome. The paper can be consulted with advantage by all those who are interested in this means of mosquito control. N II

MURRAY (David R. P.) Problems concerning the Efficiency of Oils as Mosquito Larvicides.—II. The Spreading Power of Oils and Methods of Increasing it.—*Bull. Entom. Res.* 1939 July Vol. 30. Pt. 2 pp. 211-236. [12 refs.]

"1 A method is described of using the Adam-Langmuir surface pressure trough for the direct measurement of the spreading power of oils against surface contamination.

"2 Pure higher paraffins are non-spreading and pure aromatics have only a small spreading pressure. Commercial grades of oils owe what spreading pressure they have to impurities which are only present in small quantities and can be removed.

"3 The spreading power of oil is greatly increased by irradiation of very thin layers of the oil. Even so, only a small fraction undergoes chemical change, the great bulk being recoverable with its original properties.

"4 Straight chain fatty acids and alcohols only raise the spreading pressure of clean oil to a figure which is often already reached in a cruder product. There is some evidence however that a simple group such as -OH can produce a high pressure if attached to the right hydrocarbon framework. Of the substances investigated the ones producing the greatest effect were the products of combined polymerization and oxidation of olefinic hydrocarbons (cracked spent gum) and the products of sulphonation of oils.

"5. Substances soluble in water do not form good spread-aids because they dissolve out of the oil which then contracts again if there is resistance to its spread.

"6 The maximum spreading pressure exerted by a substance in oil solution is greater in paraffin than in aromatic oils.

"7 When oil is shaken with a solvent which separates aromatics from paraffins, the spreading constituents, whether naturally occurring or added, pass into the aromatic fraction. Strong concentrates can be obtained in this way and methods can be easily devised for transferring the active materials from one oil to another.

"8. The spreading constituents can be entirely removed from oil by filtering it through fullers earth."

[See also this *Bulletin* 1933, Vol. 33 p. 654]

- JURCIK (F F) & BOZHENKO (V P) Utilisation des suspensions de poisons pulvérulents dans la lutte antilarvaire [Use of Suspensions of Poisonous Powders as an Anti-Larval Measure].—*Med Parasit & Parasitic Dis* Moscow 1939 Vol. 8 No 2. [In Russian pp 170-176 French summary p 176]

Suspensions of Paris green are more effective cheaper and more convenient than dust mixtures. In simple aqueous suspension Paris green, 1.5 to 2 kgm. per hectare kills all larvae of mosquitoes in open reservoirs. Its use is five times cheaper than oiling. Either petroleum or naphtha 1 to 2 kgm per hectare increases the floatability of the Paris green though in these doses these substances exercise no direct lethal effect on larvae. The authors recommend Paris green 0.6 kgm naphtha or petroleum 1 to 2 kgm. suspended in water, per hectare of surface to be treated.

N IV

- LA FACE (Lidia) Sull'anofelismo della bonifica di Maccarese. [Anopheline Prevalence in the Maccarese Reclamation].—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol. 2. Pt. 1 pp 213-220 With 5 figs. (4 on 2 plates)

Much has been written of the wonderful achievement of the Maccarese bonification. The author reports that two races of *A. maculipennis* still persist in that region *typicus* and *labranchiae*. The latter is most prevalent in that part of the region in which agricultural improvements have been less developed. The importance of further studies into the conditions of rice cultivation in the areas in which *A. m. labranchiae* is particularly abundant is stressed.

N IV

- WILLIAMS (L. L.) Jr Malaria Prevention Activities, 1938.—*Southern Med J* 1939 Aug Vol. 32. No 8. pp 851-853

This is a summary in general terms of the progress effected during the year in malaria prevention activities in the southern States. The majority of the State health departments in the malaria belt now have malaria control units.

N IV

- BOLETIN SANITARIO Buenos Aires. 1939 Jan. Vol. 3 No 1 pp 891-915 With 16 figs. & 1 plate.—Metodos de lucha antipaludica en la Republica Argentina. Informe presentado a la 2. Conferencia Sanitaria Panamericana por el Presidente del D. N. de H. Dr Miguel SUKINI [ALVARADO (C. A.)] Apéndice. Metodos especiales de lucha antipaludica el Subterráneo Biológico [VILLAGRÁN (Rafael)] [Anti-Malarial Measures in the Argentine]

HELMINTHIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Ascaris infection.—AUGUSTINE (p 297) quotes experiments which indicate that the *Ascaris* of monkeys is a strain distinct from that of man and that *Macaca mulatta* is not susceptible to infection with

meal, this continuing for two weeks, and death from pulmonary tuberculosis followed on day 45. During life no larvae were obtained from throat or nose and no eggs were found in the faeces. After death there were no adults in the intestine, the care taken in this examination being evident from the report that 18 female *Strongyloides* were recovered from scrapings of the mucosa. A third monkey fed on these infective eggs from man had for three weeks been on a diet deficient in vitamin A. It showed no ill effects from the infective meal but a month later evidence of tuberculosis cervical lymph nodes appeared. It died on day 89 and no ascariids or other helminths were present in the bowel. A fourth monkey on adequate diet and fed on 3 000 eggs from the pig *Ascaris* showed no ill effects and passed no *Ascaris* eggs during the 8 months of observation. Monkeys are not susceptible to this infection, the experiments indicate that the monkey *Ascaris* is a strain distinct from that of man.

Clayton Lane.

MASSIAS (Ch.) & NGUYEN DINH HAO. Poly-invagination intestinale par ascariidose. Hyperasotémie à 6 grs. 45. (Intususcception due to *Ascaris*).—*Rev. Méd. Française d'Extrême-Orient*, 1939. May. Vol. 17. No. 5. pp. 615-618.

A youth came into hospital subcomatose with a history of having vomited and passed bloody stools. He had no fever and no abdominal abnormality was discovered, but *P. ovum* was present in the blood. He died 4 days after admission having had bilious vomiting and passed a blackish stool. In the faeces were eggs of *Ascaris*, *Trichuris* and hookworms. At autopsy there were four separate invaginations of the small intestine about 10 cm. apart and in two of them was an *Ascaris* which left its impress on the mucosa. The blood urea was raised to 0.645 gm. per 100 cc.

C. L.

BOLOGNA (Mario). Osservazioni clinico-chirurgiche sull'ascaridiosi. (*Ascaris* Infection and Surgery).—*Riforma Med.* 1939. July 22. Vol. 55. No. 29. pp. 1099-1106. 1109.

In two instances during herniotomy an *Ascaris* was felt within the intestinal loop. In one it was reduced, colic followed the operation and a glycerine enema effected the expulsion of a knot of worms. In the second it could not be reduced and was extracted through a nick in the intestinal wall, the patient dying and autopsy being refused. In two others annulating peritonitis there were worm knots, in one 42 ascariids were passed after operation. In the other operation was followed by death and the finding of a knot of worms in the ileo-caecal junction at autopsy. In a patient operated on for peritonitis an *Ascaris* lay in the peritoneum near a small hole in the bowel. In two more a worm lay in the appendix. The work of others on various aspects of the subject is noted.

C. L.

ROMAN (E.). Biologie d'*Ascaris lumbricoides* jeune infestation pulmonaire de rongeurs réinfestation de l'homme parasite [Biology of Young *A. lumbricoides*. Lung Infection of Rodents. Reinfestation of Man].—*C. R. Soc. Biol.* 1939. Vol. 130. No. 12. pp. 1168-1170.

"It is thus proved that a man who harbours an adult *Ascaris* can be reinfected from eggs of the same species which thus accomplish at least a considerable part of their parasitic cycle."

This conclusion which is unexpectedly looked on as new is based on the passage by a man after tetrachlorethylene of an adult female *A. lumbricoides* and in addition two small ones measuring 21 and 22 mm long. The author claims to be the first to show that field mice infected by being fed on embryonated *Ascaris* eggs show pulmonary symptoms.

C. L.

VARLAKOV (S. L.) Matériaux pour l'investigation de l'effet exercé par certains anthelminthiques sur les lombrics et les ascarides du porc *in vitro* [The Effect of Certain Anthelmintics on the Ascarids of Pigs *in vitro*]—*Ussr Parasit & Parasitic Dis* Moscow 1939 Vol. 8 No 2. [In Russian pp 229-234. French summary p 234.]

BRADY (Frederick J.) & WRIGHT (Willard H.) Studies on Oxyuriasis. XVIII. The Symptomatology of Oxyuriasis as based on Physical Examinations and Case Histories on 200 Patients.—*Amer Jl Med Sci* 1939 Sept. Vol. 198 No 3 pp. 367-372. [12 refs.]

Two hundred cases of oxyuriasis were studied with a view of ascertaining the symptomatology of this condition. In each case a history was taken a physical examination was made a stool sample was examined for helminth ova, anal swabs were made and in girls, a vulvar swab was made. The opinion is expressed that symptoms may be caused by mechanical stimulation and irritation by the parasite, by allergic reactions and by the transportation of organisms to places where they may become pathogenic.

Many infested children showed gains in weight, improvement in color and disappearance of dark circles under the eyes after treatment.

There was an average eosinophil percentage of 5.1 per cent. in 144 pinworm cases compared to 3.7 per cent. in 21 children coming from households in which all individuals were free from pinworms. There is too much deviation from the mean for these figures to assume statistical significance but it is likely that there is a slight increase in eosinophil percentage in oxyuriasis.

One case presented symptoms of nausea and vomiting that could not be attributed to causes other than the pinworm infestation. These symptoms disappeared when the pinworm infestation was eradicated. We found no proof that abdominal pain and oxyuriasis were directly related. Only 1 case of the 200 had had an appendectomy. The appetite in many cases was much improved after treatment.

It is believed that pinworms cause conscious sensation when moving on the rectal and anal mucosa, but that no sensation is felt in the majority of cases after the pinworm has migrated onto the skin. Allergic reactions to pinworm products are probably associated with the very marked sensation experienced by some few individuals from skin migrations.

Enuresis was not found to be more common in infested patients than in non-infested controls. Evidence is presented that a pinworm vaginitis may be much more frequent than it has been considered to be in the past.

Restlessness and insomnia are symptoms occurring in pinworm cases. Restlessness in school may lead to scholastic difficulties. The feeling of shame that an impressionable child may have from the knowledge that he or she has pinworms may have repercussions in the behaviorism of the child. Evidence to show that pinworms cause nervous irritability was inconclusive.

CRAM (Eloise B.) & NOLAN (M. O.) Studies on Oxyuriasis. XIX. Examinations of Children in a Private Nursery School over an 18-Month Period.—*Public Health Rep.* 1939 Apr 7 Vol. 54 No. 14 pp 567-574 With 1 fig. [21 refs.]

In a modern well-equipped private nursery day school for well-to-do white children in Washington examinations for threadworms were made by the NIH swab. Of 106 children originally present 55 per cent were infected and of 974 swabs used on them 13 per cent. were positive. Of 23 new scholars 8 per cent. were positive. The results of examinations varied considerably from month to month, but after control measures had been instituted the incidence fell, and in the last five months no new infection had been detected.

The control measures consisted of a series of non-medicated enemas, the cleaning of the water closets and washbasins with lysol, which was also sprinkled on floors before sweeping, the sunning of the cots and blankets the children used during the rest period, each child had its own towel, and hand washing after defaecation and before feeding was seen to

C. L.

MINDLIN (S.) & URRUTARRI (A.) Tratamiento de la oxyuriasis por enemas de éter [Treatment of Enterobius infection by Ether Enemas].—*Revista Med. Argentina.* 1939 Aug 16. Vol. 26 No. 33 pp 1603-1606.

The enema is to be used as the sole treatment. It is given as 20 grams of ethyl ether in 100 grams of liquid vaselin C.S.P. the dose being one or two teaspoonfuls according to age mixed with an equal quantity of olive oil, pure or mixed with milk, to prevent proctitis and given every 8 or 12 hours for a week with a week's respite and another week's use. In an alternative enema are added 2 per cent. each of essence of allium sativum and allium cepa while the basis is cod liver oil and sweet almond oil. Two cases are described.

C. L.

POLAN (John P.) The Preparation and Cleaning of the NIH Anal Swab used in the Diagnosis of Oxyuriasis.—*Public Health Rep.* 1939 July 28 Vol. 54 No. 30 pp 1392-1395 With 3 figs.

OHAMA (Smken) Investigation on the Incidences of *Wuchereria bancrofti* among Primary School Children in Yagyu, Okinawa Prefecture.—*Tamkex Igakhei Zasshi (Jl Med. Assoc. Formosa)* 1939 Nov Vol. 33. No. 11 [In Japanese pp. 1625-1631] English summary p 1632.]

Examination of peripheral blood obtained at night has been carried out on 113 children of Kabura and 238 children of Taketomi primary schools in order to investigate the incidence of *Wuchereria bancrofti* amongst them. The results are summarized as follows:—

1. The average rate of infestation for Kabura and Taketomi primary schools was 20.35 per cent and 11.78 per cent respectively, the average rate for the total number of 351 children being 14.81 per cent.

2. Rate of infection of filariae when observed according to sex shows the following results: Male children, Kabura, 18.18 per cent, Taketomi, 10.57 per cent; female children, Kabura, 24.14 per cent, Taketomi, 12.17 per cent, the average rate being 19.48 per cent for male and 16.18 per cent for female children.

3 When the incidence of the children of these two primary schools is observed according to degree the majority of cases are very light (51.82 per cent.) followed by light (44.23 per cent.) moderate cases being only few (3.58 per cent.) Again when the degree of infection is observed according to sex, in the males the numbers in order are light (58.33 per cent.) very light (37.50 per cent.) and moderate while in the female they are very light (64.29 per cent.) light (32.14 per cent.) and moderate.

4 When the incidence of the children of the two primary schools is observed according to age the degree of infection is gradually seen to increase with advancing age.

BASU (B C) & RAO (S Sundar) *Studies on Filariasis Transmission.*—
Indian Jl Med Res 1939 July Vol. 27 No 1 pp 233-249
 With 4 graphs.

Nearly ten thousand *Culex fatigans* which had fed on blood containing microfilariae were studied and the results are tabulated to show the degrees of infection and of infectivity disclosed when the insects had lived at varying temperatures and humidities when there was varied density of infection in those on whom the insects fed and when the age and race of the donors differed.

There are unexplained discrepancies between the different tables for example the numbers of mosquitoes that survived for examination were 3,395 or 4,394. But it seems clear that the physical conditions in which larvae best reach infectivity lie between 70° and 80°F and 70 to 100 per cent of relative humidity, indeed at 80°F and 90 per cent. of humidity all mosquitoes became infective. When these same total figures were so arranged as to consider the microfilarial blood count and that alone they showed the highest infection and infectivity when the numbers of larvae in 0.2 cc. of blood were between 101 and 150 (the respective percentages being 42.3 and 17.1) and the lowest when these numbers were between 301 and 600 (the respective percentages being 1.4 and 0). When figures were analysed according to the ages of those on whom the mosquitoes fed the percentage of infectivity of 4,394 insects surviving after being fed on patients between 11 and 40 years old lay between 9.1 and 10 in 89 aged between 41 and 50 it was 28 in 73 aged between 51 and 60 it was 63. As to race, or as one table puts it caste the number of mosquitoes surviving after feeding on Hindus was 2,677 with an infectivity percentage of 9.1 the corresponding figures for Mohammedans were 1,423 and 12.7 those for Indian Christians were 294 and 21.4. This table then classifies the figures rather by religion than by race or caste.

[Three tables analyse the numbers of microfilariae found in 3,395 mosquitoes when they are classified firstly according to the temperature, secondly according to the atmospheric humidity at which they were kept and thirdly by the numbers of microfilariae on which the insects fed. In each analysis the factor under consideration shows a marked influence but the real influence of each will be made evident only when the figures (which presumably refer to the same mosquitoes) have been so arranged that the other two factors do not vary and to republish them so tabulated would give its full value to a massive piece of detailed work. The opportunity could then be taken to indicate the interplay between these results and those obtained from the examination of 4,394 mosquitoes analyzed in two more tables according to the age and caste of the donor.]

DASSANAYAKE (W. L. P.) Filarial Infection in Relation to Physiographic Changes in Two Localities in Ceylon.—*Jl Trop Med. & Hyg* 1939 May 15 Vol. 42. No. 10. pp. 145-149

History observation and reasoning lead to the conclusion that Malayan filariasis was formerly common in two areas in Ceylon and that changes in physiographic conditions, by getting rid of *Pistia stratiotes* have eliminated the filarial infection.

Batalagoda tank is an artificial collection of water held up by a dam which is believed to date back to about 100 B.C. Constant breaches brought into being below it a great swamp and in that swamp *Pistia* flourished. For that statement the justification is that thanks to the educational work of the Department of Medical and Sanitary Services most people can now recognize the plant. Restoration of the dam was begun by Parker in 1900 and has been completed for a number of years and associated with the work was Madahapola Dassawa, now a retired chief headman, who remembers the tank before its renovation and when covered with *Pistia* plants. At that time THORNHILL reported there many cases of elephantiasis of the legs but could find none of other parts, and of 15 persons without symptoms he discovered nocturnal filaria in five. In 1937 Dassanayake made a night blood survey and found no microfilariae those examined including 104 from villages named by Thornhill, and his investigation disclosed only 2 cases of elephantiasis, one from each of two of these villages.

Again MANSON BAKER (1914) found in a certain village a number of cases of filariasis and a microfilaria rate of 22 per cent. In that village Dassanayake found a microfilaria rate of 0.6 per cent. (1 of 162 persons examined) and two cases of elephantiasis. What had happened in the meantime was an encroachment of paddy fields into the swamp under stress of growing population the appearance of the water hyacinth, the intervention of the Agricultural Department bringing about the drainage of the swamp and the practical disappearance of *Pistia*.

C. L.

HODGKIN (E. P.) The Transmission of *Microfilaria malays* in Malaya.—*Jl Malaya Branch Brit. Med. Assoc.* 1939 June. Vol. 3 No 1 pp. 8-11

The larvae and pupae of *Mansonia* species "force their specially modified spiracles into the air-containing tissues of water plants" as to these each species of *Mansonia* has its preferences and therein lies the value of the study of the biology of these insects and the possibility of applying species sanitation to their control.

"*Mansonia annulifera* appears to prefer to attach itself to the roots of *Pistia stratiotes*, a very common water plant particularly in Chinese fish ponds. *M. uniformis* on the other hand prefers the water hyacinth (*Eichornia crassipes*) but also breeds prolifically where there are other plants, particularly a certain swamp grass (*Isachne australis*). In what way *M. culicoides* differs in its preferences from *M. uniformis* it is difficult to say but the adults of the two species have not been found to be common together. The larvae of *M. culicoides* have not yet been found, but from the distribution of this species it is safe to assume that it breeds in jungle though not necessarily only there. The fifth and most important species, *M. longipalpis* is to be found attached to the fine roots of certain swamp loving trees. These roots emerge from the soil and float about in the water which in such places is often as much as three feet deep. Whether the larvae of this species will be found in other places remains to be seen.

its haunts are not such as to encourage much careful conservation since not only does it bite by day in the jungle but as can well be imagined leeches abound in such places and are lavish in their attentions. It is however safe to say that it only exceptionally breeds with the three species whose breeding places are known.

In South India, where *M. annulifera* is the vector of *Mf. malayi*, it has proved possible to stop the transmission of the disease simply by removing by hand all the *Pistia stratiotes* which is essential for the development of *M. annulifera*. Such a delightfully simple method of preventing the transmission of the disease seems to be out of the question where *M. longipalpis* is the vector and at present I can see no alternative to extensive drainage.

It may be some time before drainage can have much effect on the areas where the disease is already endemic, but when new areas are being opened their proximity to actual or potential breeding places of *M. longipalpis* should be borne in mind. The danger of providing breeding places for *M. longipalpis* by blocking the drainage must also not be forgotten.

Although it may be impossible to effect a startling reduction in the transmission of the disease by applying our knowledge of the biology of the vectors the incidence of filariasis can be reduced and the formation of new endemic areas avoided.

[It is clear that as was wrongly supposed by the reviewer (this Bulletin 1939 Vol 36 p 150) it is not merely *Pistia* which is in question in the prevention there of Malayan filariasis since as is now disclosed the main local vector is held to be *M. longipalpis* and its young forms do not the evidence is prefer *Pistia*.] C L

BONNE WEPSTER (J) Notes on Mosquitoes from the Netherlands Indies. Two New *Mansonia* Larvae from Borneo—*Meded. Dienst d. Volksgezondheid in Nederl. Indië* 1939 Vol 28 No 1 pp 11-13 With 2 plates [Reviewed in *Rev. Applied Entom.* Ser. B 1939 Sept. Vol 27 Pt 9 p 187]

In August 1937 the author received from the interior of Borneo 3 females of *Mansonia annulata* Leac. and 4 of *M. longipalpis* Wulp from a Dyak village in which the population was infected with *Filaria* (*Microfilaria*) *malayi*. A few weeks later he received another 12 females all taken on man comprising 2 of *M. longipalpis*, 6 of *M. indiana* Edw. and 4 of *M. crassipes* Wulp. Several larvae were subsequently collected there in a small lake near the roots of a common vegetable *Ipomoea* sp. the lake was usually covered with *Eichhornia crassipes* but the larvae were not observed near the roots of this plant. A series of *M. longipalpis* and *M. crassipes* were bred from larvae in test tubes with *Ipomoea* as the host plant the larvae of these species are described.

BONNE WEPSTER (J) & BRUG (S. L.) Observations on the Breeding Habits of the Subgenus *Mansonioides* (Genus *Mansonia* Culicidae)—*Tijdschr. Ent.* Amsterdam 1939 Vol. 82. Pt 1-2 pp 81-90 [18 refs.] [Summarized in *Rev. Applied Entom.* Ser. B 1939 Sept. Vol 27 Pt 9 p 187]

The following is based on the authors' summary of observations on the breeding habits of mosquitoes of the subgenus *Mansonioides* of *Mansonia* carried out in Batavia and in a swamp of the Serajoe Delta, Java. The larvae and pupae are often difficult to detect and a search for the eggs is sometimes more successful. Eggs, larvae and pupae may

be found on water plants other than *Pistia* even in breeding places well stocked with this weed. *Mansonia (Mansonioides) uniformis* Theo. used a considerable number of water plants, lists of which are given as hosts either for its eggs or for its larvae and pupae. If only *Pistia* is present the majority of the larvae sometimes occur not on its roots, but in the water or mud at the bottom. Some evidence was obtained that oviposition and hatching in *M. (M.) annulifera* Theo. occur periodically.

PRAWIROHARDJO (Soewadjo) Infectieproeven met microfilaria bancrofti bij verschillende muggensoorten in Batavia. [Tests of Infectivity of *Mf. bancrofti* for Mosquitoes in Batavia.]—*Geneesk Tijdschr v. Nederl. Indië* 1939 July 4. Vol. 79 No. 27 pp. 1691-1705 With 1 plate English summary

"The importance of *C. fatigans* as intermediate host of *Filaria bancrofti* differs in various parts of the Dutch East Indies as demonstrated by Bato. There are indications of similar differences in adaptability to act as carrying agents of filariasis bancrofti among other mosquito species. To supply additional data concerning this phenomenon, mosquitoes were allowed to feed on the same bancrofti-patient in Batavia and dissected after varying intervals. These mosquitoes were partly wild, partly laboratory bred. The wild ones were captured after entering the mosquito-curtain during the night under natural conditions, the laboratory bred mosquitoes were let loose in the curtain during the evening. The possible fallacies of the method are discussed. Much attention was given to the completeness and the rapidity of filarial development and to phenomenon of clutimisation in the dissected specimens.

The author comes to the following conclusions:

Good vectors for filariasis bancrofti in Batavia. *Culex fatigans*
Anopheles ludlowi *Anopheles subpictus*

Probably good vectors in Batavia. *Anopheles fuliginosus* *Anopheles agas* *Anopheles barboscirus typicus* and *Anopheles tessellatus*

"Probably of little importance as vectors in Batavia. *Culex sitiens*
Culex whitmorei and *Culex fuscocephalus*

Of no importance as vectors in Batavia. *Culex tritaeniorhynchus*
Culex tritaeniorhynchus *Culex gelidus* *Culex batesianus* *Aedes albopictus*
Aedes aegypti *Armigeres obsoletus* *Mansonia annulifera* and probably also *Mansonia indiana*

KNOTT (James) A Method for making Microfilarial Surveys on Day Blood.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939 July 28. Vol. 33 No. 2 pp. 191-198

Any case showing microfilariae in the night blood will show microfilariae in the day blood also if sufficient of it is searched.

It is far easier to make a survey on day than on night blood, and this paper considers means by which a large quantity of blood may be taken by day, laked, and made available for rapid examination.

The quantity of blood used is 1 cc. If this is laked in hypotonic sodium citrate solution the gravity precipitate is fluffy and cannot satisfactorily be spread or stained. If laked in dilute formalin solution the gravity sediment is compact and spreads and stains readily. The method is as follows. In a 15 cc. conical centrifuge tube are placed 10 cc. of a 2 per cent. solution of the standard aqueous formalin (which contains 40 per cent. of gaseous formaldehyde). To this is added 1 cc. of blood taken by syringe through a fine needle from a vein (quicker and less painful than lancing the finger) and the whole is thoroughly mixed by shaking and tilting. The tube is set aside for 12 to 24 hours,

decanted by a quick tipping which carries away fluid and bubbles but does not disturb the sediment. The latter is removed by a long capillary pipette containing a little clean water and fitted with rubber tube and mouthpiece the contents discharged on to a slide mixed and spread over 2 by 3 cm. as a thin film and dried flat. For staining these are the instructions —

The dry spread is stained for 2 or more minutes with Loeffler's methylene blue (saturated solution of methylene blue in alcohol, 30 c.c. aqueous 1 in 10 000 solution of potassium hydroxide 100 c.c.) then rinsed free of excess stain and dried. It is next counterstained for 1 or 2 minutes with 0.5 per cent aqueous solution of eosin rinsed and dried. The eosin removes the methylene blue from the leucocytes and stains them a purplish red. The microfilariae retain the methylene blue the nuclei and cytoplasm staining but not the sheath but if left on too long the eosin will decolourize the parasites as well as the leucocytes. Giemsa stain shows up with the structure of the microfilaria the nuclei staining sharply and the sheath being beautifully evident but it must be used on sediment spreads or thin blood films, where there is little stained fibrin in the background though double staining with haematoxylin and eosin is very good on blood spreads the formalin sediment does not stain well with haematoxylin.

Sediment spreads are good for close study of the structure of the microfilaria because of the attitudes they take up. Thus when a drop of water or oil is spread over the stained area and the slide examined with the 16 mm. ($\frac{5}{8}$ inch) objective and the 5 power ocular without a cover slip the background is made up of the purplish-red leucocytes which are as thick as red corpuscles in an ordinary thin blood spread the microfilariae are found stretched out into half or quarter circles they readily strike the eye by the colour contrast and the linear breaks in the background of the field.

The use of this method for the making of a survey in regions where filariasis is periodic is described in detail. This survey comprised 155 lads between 16 and 22.

of the 66 positives 20 or 30.3 per cent were shown by the 20 c.mm. day drop 54 or 81.8 per cent by the 20 c.mm. night drop 57 or 86.8 per cent. by the 1 c.c. day sediment and 62 or 94 per cent. by the 1 c.c. night sediment, while four more were found by the 10 c.c. night sediment.

C L

GALLIARD (H) & NGUYEN HUU PHUEN. Sur la périodicité dans la filariose à propos d'un cas d'infestation par *Filaria malayi* [Periodicity in a Case of Infection with *F. malayi*]—*Ann Parasit Humaine et Comparée* 1939 May 1 Vol. 17 No 3 pp 193-198. With 2 charts

From a man whose work when not in hospital necessitated irregular hours of sleep the authors on four different occasions made two-hourly examinations of finger blood each series covering 24 hours. The organism in question was *Mf malayi*. They point out that the maximal and minimal numbers were found on different occasions at different hours and that the total numbers over the 24 hours were quite variable. Even when in hospital the aortic regurgitation from which he suffered prevented his sleeping properly at night. They hold that in spite of all that has been said on the subject of periodicity we have advanced little and must be content to observe facts. [Nor should it be taken for granted that the periodicity of appearance of *Mf malayi* is applicable to that of *Mf bancrofti*]

C L

SAWITZ (VIII) *Trichinella spiralis*. I. Incidence of Infection in Man, Dogs and Cats in the New Orleans Area as determined in Post mortem Examinations.—*Arch. Pathology* 1939 July Vol. 28. No. 1 pp. 11-21 With 2 figs. [16 refs.]

Sawitz has already reported on 200 autopsies made in New Orleans to determine the extent of evidence for trichiniasis in them [this *Bulletin* 1938 Vol. 35 p. 383]. He has now brought the number up to 400 and the present report deals with them all.

Examination of human diaphragms and pectoral muscles obtained in four hundred routine unselected necropsies disclosed 24 cases of infection with *T. spiralis* in the New Orleans area—an incidence of 6 per cent. The compressor method detected 2 cases; the digestion method, 24. Of the 23 cases in which both the diaphragm and the pectoral muscle were available the diaphragm was found infected in 20 cases, or 87 per cent, and the pectoral muscle in 13 cases, or 56.5 per cent. Surveys in which diaphragms only are examined would thus miss 19 per cent of the cases. The average number of larvae of *T. spiralis* found in the diaphragm was 0.35 per gram; the average number in the pectoral muscle 0.22 per gram. The diaphragm is, therefore, not only qualitatively but also quantitatively the better tissue for examination. No history of clinical symptoms of trichinosis was found in any of the 24 cases. With increasing age the incidence of trichinella infection increased. The highest incidence was found in negro females (6.68 per cent); the lowest, in white females (5.8 per cent).

The incidence of trichinella infections in 300 dogs in the New Orleans area was found to be 1.3 per cent; the incidence in 80 cats was found to be 10 per cent. The incidence in cats is considered to serve as an indicator of the endemicity of trichinella infection in an area.

C. L.

TANG (C. C.) *Trichinella* Infection in Rats in Fukien.—*Chinese Med. J.* 1939 June. Vol. 55 No. 6 pp. 537-541 With 4 figs. [10 refs.]

In the Foochow area the author discovered no trichiniasis in 114 rats examined by compression of the diaphragm. Within the city wall of Sa Huen cysts were present in 2.19 per cent. of 136 rats, more than 50 cysts having been counted in one diaphragm. Examinations of hog diaphragms are being made.

C. L.

FAIRMERGER (Theodore R.) & SPALDING (Janet E.) *Diagnosis of Trichinosis*.—*Amer. J. Dis. Children* 1939 July Vol. 58. No. 1 pp. 129-130

Three of a family of six children showed *Trichinella* larvae in their venous blood.

The symptoms of all three came on at the same time and were typical. The blood was obtained from the antecubital vein, 10 cc. being withdrawn, mixed with 25 cc. of a 2 per cent. solution of acetic acid and centrifuged thoroughly and the sediment was examined directly by smears stained with Wright's stain. During the twelve days following the first examinations the percentage of eosinophils increased respectively from 36 to 51, 13 to 41 and 11 to 30. The intradermal tests done on two occasions were negative in all; precipitin tests were positive in two, negative in one.

C. L.

EVERS (Lorance B) Manifestations of Trichiniasis in the Central Nervous System. Report of a Case with Larvae in the Spinal Fluid. —*Arch Intern Med* 1939 May Vol. 63 No 5 pp 949-956 With 1 fig [31 refs.]

The author sums up as follows —

A case of trichiniasis which presented a clinical picture of toxic encephalitis and neuroretinitis with subsequent recovery is reported. Motile larvae were isolated from the spinal fluid after the encephalitic signs had largely disappeared.

Review of the literature reveals that the presence of larvae in the spinal fluid does not always produce clinical manifestations of involvement of the nervous system. Larvae of *T. spiralis* in the spinal fluid have been reported in 24 cases. Of these 4 were fatal a mortality rate of 28.6 per cent.

From the reported cases it seems probable that careful examination of the spinal fluid in suspected cases of trichiniasis with or without symptoms of involvement of the central nervous system, may aid in the diagnosis of this disease.

McNAUGHT (James B) BEARD (Rodney R.) & DEEDS (Floyd) Effects of Sulfanilamide, Phenothiazine and Thionol in Experimental Trichinosis. —*Proc Soc Experim Biol & Med* 1939 May Vol. 41 No 1 pp 17-20

(1) A rather large amount of sulfanilamide 0.96 g per kilo of body weight daily used over a period of 6 weeks reduced the number of trichinella encysting in the muscles of rats by 65 per cent. (2) The continuous use of phenothiazine in a dosage approximately one-tenth that of sulfanilamide over a period of 6 weeks reduced the severity of trichinosis infection in rats by 74 per cent. and warrants further experimentation. (3) Thionol is of little use in reducing the severity of trichinosis infestation in rats.

OTTO (G F) & ABRAMS (Evelyn) Quantitative Studies on the Effect of Heat on Trichina (*Trichinella spiralis*) Larvae —*Amer J Hyg* 1939 May Vol. 29 No 3 Sect D pp 115-120

The experiments confirm those of RANSOM and SCHWARTZ (*J Agric Res* 1919 Vol. 42, p 201) that 55°C is the lowest temperature that will destroy trichinella larvae. This knowledge cannot be used to raise by diathermy a host's temperature to the degree lethal to larvae the rat hosts died the larvae survived C L

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1939 Apr 29 Vol. 112, No 17 p 1751 —Incidence of Trichinosis. [Queries and Minor Notes.]

BLEYER writes to the editor that in the issue of the *Frankische Tageszeitung* of 29th January 1939 it is stated that 17 millions of Americans suffer from trichiniasis and that the paper continues

Nothing is done to protect the people but nevertheless, they build skyscrapers. A long editorial note gives the position as has from time to time been noted in this *Bulletin* and as regards the efficacy of methods of meat inspection reminds us that STILES after two years of observation in 1898 of the German method of food inspection concluded that of the 6,329 cases of trichinosis which were detected in Germany between 1881 and 1898 3,388 cases with 132 deaths appeared to be due to faults of the method of German food inspection.

C L.

DONIK (N N) *Indépendance des espèces Trichocephalus trichurus* (L. 1771) et *Trichocephalus suis* (Schränk, 1788) (Independence of *Trichocephalus trichurus* and *T. suis*).—*Med. Parasit. & Parasitic Dis.* Moscow 1938. Vol. 7 No. 6. [In Russian pp. 907-917. With 2 figs. [11 refs.] French summary p. 918.]

On the grounds of slight difference in mean measurements of young and adult forms, of time of development and of numbers of chromosomes these forms are held to be specifically distinct. *T. trichurus* and *T. suis* are dealt with in that order below. Eggs in microns, length 57.75 and 62.6 width 28.83 and 29.55 infective larval length in microns 125 to 148 and 150 to 165 spicule, length in millimetres 2.9 to 3.4 and 1.9 to 2.5 number of chromosomes 4 and 6 development to infectivity more rapid and less rapid. C. L.

DONIK (J A) & DONIK (N N) *Observations sur le développement des oeufs du Trichocephalus trichurus* (L.) dans le sol. (Development of Trichocephalus Eggs in Soil).—*Med. Parasit. & Parasitic Dis.* Moscow 1939 Vol. 8. No. 2. [In Russian pp. 221-228. French summary p. 228.]

The time taken for the development to infectivity of Trichocephalus eggs buried in soil has varied between 24 and 40 days with the site, whether sunny or not, and with the depth of burial and at the same mean temperature the rates seem to be the same in water or in soil.

C. L.

BERIBERI

PRÉCIS OF ABSTRACTS IN THIS SECTION

HOVERERO (p. 311) describes shoahin, a symptom complex of acute cardiac failure which occurs in beriberi. It is a medical emergency but usually responds quickly to injections of vitamin B₁. SIN (p. 311) also describes acute cardiac beriberi and the success which follows energetic vitamin therapy. Kuo (p. 312) discusses the cardiovascular manifestations of beriberi and describes the vitamin B₁ treatment given.

WZGELIUS (p. 313) reports a case of avitaminosis with symptoms of beriberi and pellagra. LEMMON and NIELSEN (p. 313) describe a patient, living on an inadequate diet who had flaccid paralysis which they attributed to beriberi. On treatment with vitamin B₁ pellagra supervened but under treatment with B₁ and B₂ all symptoms disappeared. LOON and GREENBAUM (p. 314) report a patient with beriberi from marillon following intestinal operations. In comment the reviewer points out that the diagnosis of beriberi in these two cases may be open to question.

GULAYC (p. 314) warns against the indiscriminate and extensive use of vitamin B₁ in pure form in the treatment of beriberi. MATA (p. 314) shows the value of thiamin chloride (synthetic vitamin B₁) in beriberi, especially in the infantile form which had not been prevented by tiki tiki given from birth.

YOUNG (p. 315) describes beriberi in a woman whose diet consisted of milk chocolate and grapes only. paresis developed but symptoms

improved rapidly on a normal diet. JONES and BRAMWELL (p 315) record a case of beriberi in a man with a history of alcoholism and gross dietary deficiency

PANNEKOEK WESTENBURG and VAN VEEN (p. 315) give a list of the foods containing vitamin B₁ (estimated by Harris's bradycardia method) and grouped according to their richness in this vitamin

C IV

MONTEIRO (L S) Cardiac Beri-Beri A Medical Emergency —
Jl Malaya Branch Brit Med Assoc 1939 Sept Vol 3 No 2
pp 177-183

Shoshin is the name given to an acute cardiac condition occurring in beriberi so acute that it is really a medical emergency. It is not seen in those patients in whom nerve symptoms develop early because the latter necessitate complete rest. The symptoms are of comparatively sudden onset with distressing dyspnoea the patients are intensely restless with violent palpitations praecordial discomfort to agonizing pain, and they toss from side to side without relief. respiration is frequent and shallow the expression is one of anxiety pupils are dilated liver enlarged and tender a wave like motion may be visible over the heart. The pulse becomes smaller and smaller the veins dilate and the patient dies if untreated with intense dyspnoea but usually retains consciousness to the last

Vitamin B₁ in appropriate dosage brings speedy cure. It is given intravenously or intramuscularly the initial dose being 3 000-5 000 I U. If there is much overdilatation of the right side of the heart with cyanosis bleeding may do good but in many the anaemia is of such degree and the blood pressure so low that venesection is not done. As a rule diuresis comes on 24-36 hours after the vitamin is given but occasionally there is continued anuria and death takes place with symptoms of uraemia. For such patients the author recommends calc. chloride gr 15 glucose 1 dr water 1 oz. thrice daily and 2 cc injections intramuscularly of salyrgan. These cases are usually in patients with so marked a fall of blood-pressure that the kidneys fail to function. One or two ounces only of urine may be passed in 24 hours and this contains granular and hyaline casts and much albumen and the blood urea may be as high as 350 mgm. per cent H H S

SEIN (Mm) Clinical Notes on the Treatment of Acute Cardiac Beri-Beri
—*Indian Med Gaz* 1939 June. Vol. 74 No 6 pp 344-347

The author rightly calls attention to the likelihood of acute cardiac types of beriberi being overlooked in places where the great majority of cases are of the chronic forms and also to the fact that such acute types may suddenly arise in the course of the disease even when the patient is under treatment by dietetic measures. The picture presented is that of acute dilatation and heart failure—marked orthopnoea cyanosis restlessness and oedema. If the condition is left untreated death soon occurs usually within 72 hours. If however a certain line of treatment is adopted the prognosis is vastly improved. Details are given of five patients in whom the diagnosis was made promptly and treatment started at once and all five recovered. The treatment adopted with such success was on the following lines. A large initial dose of vitamin B 3 000 units of Betaxin is given intravenously in 10 cc. of hypertonic glucose solution (in one instance the

intravenous route was not feasible and 8,000 units were given intramuscularly instead) and oxygen was administered continuously. Relief soon is observed and the change for the better almost dramatic. Thereafter till discharge, that is usually 10-12 days, the patient receives injections of 1,000 units of Betaxin and 1/60 grain strychnine daily. The author states that the site of the initial dose of Betaxin was decided arbitrarily and the intravenous route because of the certainty of absorption and rapidity of action. Strychnine is given as a routine for its tonic action on the muscles. *H H S*

KLO (P T) Cardiovascular Manifestations of Beriberi. [Cardiovascular Manifestations of Beriberi.]—*Chinese Med. J.* 1939 May Vol 55 No. 5 pp. 427-438 With 6 charts. [20 refs.]

This paper was presented at a medical conference at Shanghai at the end of 1938 and, like most conference papers, reviews the past rather than brings forward any new facts. Beriberi is a common disease among the Chinese in Shanghai. Of 760 admissions to St. Luke's Hospital in the latter part of the year 15 per cent. were admitted with the diagnosis of beriberi whereas if the number includes patients with beriberi but suffering from, or admitted for other complaints, the total is raised to fourfold and nearly all presented cardiovascular involvement in some degree. Nearly two-thirds (60 per cent.) were between 15 and 30 years of age. The clinical manifestations included pericardial effusion, tachycardia, syncope, hypotension, right-sided failure etc.

As regards treatment the indications followed were to give vitamin B₁ 10 I U for each 100 calories of food intake or approximately 300 units daily given to cardio-vascular patients as a concentrate intravenously or to those less acutely ill, intramuscularly. If there was marked oedema dehydration was attempted with magnesium sulphate and to some glucose concentrated (50 per cent.) intravenously with the vitamin. Digitalis even in large doses was found ineffectual, a fact in accordance with general experience in these cases. *H H S*

CASTELLANI (Aldo) Pellagroid Beriberi. (Dermo-Beriberi.)—*Jl. Trop Med & Hyg* 1938, Sept. 15 Vol. 41 No. 18. pp. 294-295 With 3 figs.

A short article referring to the occurrence of pluri-avitaminoses and more especially to those cases exhibiting mild symptoms of pellagra together with signs of peripheral neuritis.

The author suggests the term pellagroid beriberi or dermo-beriberi and gives as synonyms pellagroid xerodermic beriberi, the beriberi pellagra phrynodermia syndrome etc. [Most of these terms seem to be open to objections. When shall we have in this country some representative body to determine medical nomenclature!] *H S Stammers.*

WEGELIUS (Ruth) Fall av B-avitaminosa. [A Case of B-Avitaminosis.]—*Nordisk Med* 1939 Oct. 28 Vol. 4 No. 43 pp. 3208-3210 With 1 chart. German summary.

The patient gave a history of intestinal disturbance dating back several years. The symptoms of beriberi were oedema, tachycardia, enlargement of the heart to the right and polyn neuritis those of

pellagra were typical skin changes sores at the angles of the mouth debility and mental changes. Rapid improvement took place under treatment with Ido-B-Granulat and vitamin B₁ but an exacerbation of erythema occurred after 3 weeks which responded to nicotinic acid

C W

LEHMANN (Jørgen) & NIELSEN (Holger E.) A Case of Beri-beri (followed by Pellagra), verified and followed during Improvement, by Analyses of Vitamin B₁ in the Blood.—*Acta Med Scandinavica* 1939 Vol 99 No 6 pp 577-586 With 5 figs

A 28-year-old woman one of a family of 11 all the others being healthy was admitted to hospital with bilateral symmetrical flaccid paralysis of the legs and loss of cutaneous and tendon reflexes which had developed gradually during the previous six months. The legs were swollen but there was no oedema [presumably no pitting on pressure] there was some sensory loss but no very definite determination was possible owing to mental dullness associated with blindness due to bilateral keratomalacia at 8 months of age

Except for some general muscular weakness there was nothing else to note radiographic and cardiographic investigations of the heart showed nothing abnormal blood urine and cerebrospinal fluid normal Wassermann reaction negative

In view of the dietetic history in the case an avitaminosis B₁ was diagnosed. The woman had for a long period subsisted on a little tea and coffee sweet soup a sweet some biscuits white bread and paste

Using Meiklejohn's modification of Schopfer's test [*Biochem J* 1937 Vol 31 p 1441] for estimation of B₁ in blood [average in healthy = 0.09 gamma per cc.] a value of 0.01 was found. Treatment was begun with 2 000 international units Ido B₁ injected daily for the first four weeks then every second day for three weeks and twice weekly for two weeks. Improvement was noted after the first week and in a month the patient could walk a little with support

The vitamin B₁ blood content rose to 0.10. Other symptoms then supervened the patient became emotional with some mental change diarrhoea ensued and typical pellagrous changes in the skin of the hands were noted consisting of yellowish brown pigmentation and hyperkeratosis localized especially about the knuckles and interphalangeal joints. The tongue was red and a test meal which on admission had shown a normal acid now demonstrated an achylia.

The treatment by large doses of vitamin B₁ was stopped and in place a tablespoonful of Ido B granulate (containing 50 units B₁ and 25 units B₂ per gram) was given thrice daily. This was followed by rapid improvement and all signs had disappeared in a month. The authors believe that the pellagrous symptoms developed in consequence of the exhibition of the large doses (100 000 units in two months) of vitamin B₁ and that the case goes to prove the existence of an antagonism between vitamin B₁ and the pellagra preventing factor some such part antagonism having been demonstrated in animals. [The observation is a very interesting one and very suggestive but the implications should be received with reserve until much more knowledge has accumulated. Many conditions with a flaccid paralysis of the lower limbs as the prominent symptom have been recorded in which good results have followed the exhibition of vitamin B₁ but it seems a little premature to label them beriberi.] H S Stannus

LOEB (Ludwig M.) & GREENBAUM (Regina Stolz) Beriberi Secondary to Hernia of the Mesentery.—*Jl Amer Med Assoc* 1939 May 6 Vol 112 No. 18 pp. 1810-1814 With 7 figs

A man of 39 years who had suffered much of many physicians and even more of surgeons exhibited a flaccid paresis to paralysis of the muscles of the trunk and limbs with oedema of the face back, hands legs and feet. The gastrocnemii were very tender the biceps, triceps, patellar Achilles abdominal, cremasteric and plantar reflexes were absent. There was some degree of anaemia affecting about equally the red and white cells red corpuscles 3 160 000 white 3 150 haemoglobin 62 per cent colour index 1 anisocytosis poikilocytosis and a few erythroblasts were seen. The authors diagnosed beriberi the result of inanition and some degree of temporary improvement followed the use of thiamin vitamin B₁ hydrochloride is so named by the Council on Pharmacy and Chemistry of the American Medical Association. At the age of 18 years he had had an appendectomy and an inguinal herniotomy eight years later posterior gastro-enterostomy for obstruction due to a cleaving duodenal ulcer eleven to twelve years later a posterior gastro-jejunostomy was performed vomiting continued to be troublesome so jeuno-jejunostomy was carried out but the vomiting became worse. Six months later an exploratory laparotomy revealed a hernia of 15 feet of small intestine through a defect in the mesentery. Eleven days later the patient was relieved of his sufferings by death. [See note to the paper by LEHMAN and NIELSEN above] H H S

ROCCHI (Filippo) Su di alcune ipovitaminosi secondarie [Secondary Avitaminosis.—*Policlinico Sez. Prat* 1939 Nov 20 Vol 48 No 47 pp 2002, 2005-6 2009-10 2013

Two cases are recorded here. In one a man of 40 years the patient had undergone an operation of gastro-enterostomy for a pyloric ulcer and had reduced his diet over a long period. He developed oedema which was of the nature of famine dropsy and which cleared up on taking vitamin B₁. The second was a man of 47 years who developed neuritis after treatment for diabetes—not a very convincing record.

H H S

GIANG (Rodolfo V.) Theoretical and Practical Aspects of the Treatment of Beriberi.—*Jl Philippine Islands Med Assoc* 1939 Sept Vol 19 No 9 pp 563-571 22 refs.]

A general statement of the subject stressing the importance of correcting such errors in diet or concomitant conditions as interfere with absorption of vitamin B₁ and deprecating the indiscriminate and exclusive use of vitamin B₁ in pure form in beriberi and its complications. H H S

MATA (Conrado) Thiamin Chloride in Infantile Beriberi.—*Jl Philippine Islands Med Assoc* 1939 Aug Vol 19 No 8 pp 493-498 18 refs

Thiamin chloride is synthetic vitamin B₁ and is identical in chemical form with natural vitamin B₁. It is stable not destroyed by ultra violet light or exposure to air but is rendered ineffective by the action of alkalis. The question of dosage is not yet settled because there is at present no accurate method of determining the degree of deficiency.

The following is the range recommended in units (1 mgm thiamin chloride=300 I U) Infants 100-150 I U children of 2-8 years 150-200 from 9-15 years 210-300 adults 300-500 and women in pregnancy and lactation 400-600 I U The author gives notes of 4 children out of 22 so treated but 2 of the 22 should be discarded as they did not receive the thiamin continuously. Tiki tiki was given to all from birth but did not prevent the disease. striking improvement followed the parenteral (subcutaneous intramuscular or intravenous) administration of thiamin chloride. In infantile beriberi it should be given at once and should be taken by both mother and child and continued throughout the first year of the child's life. H H S

YOUNG (J Bruce) A Case of Paraplegic Beriberi.—*Lancet* 1939 Dec 16 pp 1257-1260

This describes a peculiar case in which somewhat abnormal symptoms of beriberi appeared following prolonged reduction of diet till the patient an active woman of 48 years was living on a diet consisting almost exclusively of milk chocolate $\frac{1}{4}$ lb and grapes 1 lb daily. The vitamin content of the chocolate was per ounce 170 units of A 14 of B 17.8 of D vitamin C was present but the quantity is not stated. Her parietic symptoms appeared to involve the arms some three weeks before the legs. There was a little tachycardia, to 96 beats per minute but this was due to emotional instability not to the beriberic condition.

A month after the onset of symptoms she developed a craving for ordinary food on rational lines and improvement promptly followed. She was in hospital for three weeks on full mixed diet and Bemax 1 oz. and marmite 1 dr daily to furnish additional vitamin B₁. Four months later there were few residual symptoms—weak dorsiflexion of ankles slight swelling of ankles. Improvement continued and when she was seen a year later she professed to feeling very well, but she was losing weight and was returning to her former eccentric diet.

H H S

JONES (A. Morgan) & BRAMWELL (Crighton) Alcoholic Beriberi Heart.—*Brit Heart J* 1939 July Vol. 1 No 3 pp 187-198. With 4 figs. [25 refs.]

A bar attendant, aged 36 with a history of chronic alcoholism and gross dietary deficiency with anorexia vomiting, epigastric pain extensive oedema a greatly enlarged heart, gallop rhythm and tachycardia was treated with parenteral vitamin B₁. He lost his oedema and other signs of cardiac failure in five days the heart diminished greatly in size and he was discharged cured seventeen days after admission.

The case is compared with others that have been reported and the diagnosis of the condition is discussed.

PANNEKOEK WESTENBURG (S J E) & VAN VEEN (A G) Het vitamine B₁-gehalte van voedingsmiddelen bepaald met de bradycardie methode. [Vitamin B₁ Content of Foodstuffs estimated by (Harris's) Bradycardia Method.]—*Geneesk Tijdschr v Nederl-Indië* 1939 Nov 14 Vol. 79 No 46 pp 2891-2903 With 1 chart [Refs. in footnotes.] English summary

The authors found the method employed to be very satisfactory. For their experiments they used young albino rats bred in the

laboratory. It is common knowledge that the vitamin B_1 content varies greatly with the way in which food is prepared, as in rice polishing and prolonged heating. Cassava leaves, raw or steamed, are rich in this vitamin, but lose half the content in cooking. Leguminous seeds are another instance. The authors present a synopsis of their findings under three heads —

I *Materials so rich in B_1 that, by being added to or mixed with products that contain little B they can form a food that warrants a sufficient supply* — Such products must have a B_1 content of at least 1 unit per gramme. To these belong husked rice (*Oryza sativa*) parboiled rice, ricebran, polishings of great millet (*Andropogon Sorghum*) cassava leaves (*Manihot utilissima*) peanuts (*Arachis hypogaea*) bungkil katyang tanah (peanut presscake) ontyom (prepared by means of fungi from peanut-presscake) and most of the seeds of Leguminosae.

II *Foodstuffs that themselves contain a sufficient quantity of B_1 to warrant a sufficient B_1 supply if partaken of in proper not too small quantities but that do not contain sufficient to complement other food that is deficient in B* — These contain 30–60 units per 100 gm. To these belong partly polished rice Indian corn (*Zea mays*) great millet (*Andropogon Sorghum*) fresh sweet cassava (*Manihot utilissima*) dyesek (dried cassava skin) sweet potato (*Ipomoea batatas*) potato (*Solanum tuberosum*).

III *Foodstuffs containing only little B_1* — These contain less than 30 units per 100 gm. To these belong polished rice, ketan (glutinous rice, *Oryza sativa forma glutinosa*) getuk cassava (prepared from dry cassava root) gaplek (dried cassava) gaplek flour white bread, cow's milk, soya milk.

H H S

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No 5

SUMMARY OF RECENT ABSTRACTS *

IV TRYPANOSOMIASIS

Epidemiology

LESTER (p 204) reports that by the beginning of 1938 2 200 200 natives of N Nigeria had been examined under the survey system and 300 000 cases of sleeping sickness had been discovered. The disease has recently become epidemic in previously endemic areas and the reasons for this are thought to be the change in the habits of the people due to settled rule the increase in transport facilities and the employment of gangs of labourers in various large scale enterprises. LESTER (p 672) further shows that whereas the average infection rate found in surveys about 1930 in N Nigeria was 9.4 per cent recent surveys [1937-38] showed a rate of only 1.6 per cent. In only one area however can protective measures have had anything to do with this reduction. The disease is now much more under control than formerly and large scale preventive campaigns have been started to consolidate the gains of previous years.

DE BRAUWERE (p 655) states that in parts of the Belgian Congo trypanosomiasis has not only become less malignant but has been greatly reduced. During 1936 new cases diagnosed were 0.4 per cent of those examined. In the Foréami Report for 1937 (p 656) it is explained that although the phyto-geographical condition may be identical over the whole of a sector the disease is not uniformly distributed. Explanations of this fact may be the occupations and habits of the natives the extent of large clearings, the introduction of exogenous infection insubordination or migration of the population. The rapid retrogression sometimes noticed cannot be explained by medical action since this is equal in other areas in which retrogression does not take place and it is thought that a degree of immunity may develop in districts which have been long infected and it has been shown that trypanosomes tend to lose transmissibility after repeated passages through the same vertebrate host. But in recent foci regression under Foréami control is rapid in older foci it is slower

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

the nutrition of the population is an important factor in an anti-sleeping sickness campaign.

In French Equatorial Africa SALZON (p. 688) reports that the proportion of infection fell from 0.81 per cent. in 1936 to 0.61 per cent. in 1937.

In Uganda BROWN (p. 223) considers that an equilibrium has been attained between *T. gambiense* man and *G. palpalis* but is not yet perfect. Symptomless human reservoirs are numerous and owing to the complexity of rivers widespread infection is inevitable. CORSON (p. 737) found that some monkeys infected with *T. gambiense* lived for long periods (up to 1 174 days) and suggests that similar chronic infections, possibly undiagnosed, may occur in man (and if so, may be of epidemiological, no less than clinical, importance).

BLAIR (p. 736) found two persons harbouring *T. rhodesiense* in a village in S Rhodesia neither gave a definite history of illness. Other villagers were not infected, yet visitors, both European and native had been infected and the trypanosomes were fully virulent. Blair believes that the infection is stored in a human, but not in a game, reservoir and that local outbreaks always follow the establishment of man-fly-man cycle. The carrier state is discussed.

Sleeping sickness has been reported from Bechuanaland (p. 659) rather south than was previously known.

Aetiology

HOARE (p. 205) has correlated the data obtained by the study of the shape size and position of the kinetoplast (i.e. the kinetocentrum alone without the blepharoplast) in mammalian trypanosomes and gives a list of the features distinguishing the various groups in this respect. On this basis he cannot accept the validity of Jacson's classification. CRISTIANI (p. 661) has succeeded in infecting guinea-pigs and mice with trypanosomes and spirochaetes through the external auditory oratus and the nasal mucosa.

CORSON (p. 206) reports further work, on a strain of *T. gambiense* transmitted by *G. morsitans* which tends to substantiate his previous view that a typical strain does not easily change so as to resemble *T. rhodesiense*—no change in virulence or morphology was observed. By direct transmission however an increased virulence for rats developed—the strain became less polymorphic and nuclear displacement was rare, but there was no real resemblance to any Tanganyikan strains of human trypanosomes.

ROUBAUD and PROVOST (p. 746) found that growth was arrested in three young mice inoculated with *T. gambiense* and recall the infantilism which has been attributed to *T. cruzi* infection.

HALBERSTADTER (p. 213) has investigated the effect of X-rays on *T. gambiense*.

CORSON (pp. 206, 682) as a result of the maintenance of a strain of *T. rhodesiense* in sheep and antelopes by cyclical transmission through *G. morsitans* over a period of 4 years and tested on human volunteers, found that the infectivity to man was not lost, but does not conclude at all strains would retain it or that if it were lost under these conditions it would be so lost in nature. *T. rhodesiense* is probably a parasite of man and of wild and domestic animals and may retain its infectivity to man, even when living only in animals, for several years—perhaps indefinitely. Using white rats as test animals, no change in virulence was observed (p. 210).

BLAIR (p 736) in S Rhodesia finds little support for the view that *T. brucei* and *T. rhodesiense* are the same organism.

Transmission

SICÉ and TORRESI (p 663) discuss the influence of vapour tension and temperature on the biology of various species of Glossina. They (p 664) show that in the French Sudan in spite of the severe atmospheric conditions during 4 or 5 months of the year the pupae are resistant and certain flies a large proportion being females ensure survival from one favourable season to another. MOREAU (p 664) discusses the classification of climate from the point of view of East African biology and DAVY (p 665) the classification of tropical woody vegetation types. These papers cannot be further abstracted but are important in the study of Glossina. BROOM (p 662) describes his method of maintaining *G. morsitans* in England after the receipt of pupae by air from Tanganyika Territory. A humidity of 80 per cent. a temperature of 24°C. and either daylight or artificial lighting were effective and 23 per cent of living flies were obtained. The cycle of development of *T. brucei* occupied at least 25 days and the flies were fed after the infective feed, thrice weekly on clean guinea pigs for 3 weeks and thereafter at the same intervals on chickens.

GHIDINI (p 214) records the tsetse flies of Italian East Africa. *G. morsitans* and *G. palpalis* are present in some parts but *G. tachinoides* has not been found though it occurs in S Arabia.

CORSOV (p 203) points out that people differ in resistance to infection that is, an infected fly may infect one person but not another. Similarly a person may resist infection from one fly but become infected by another fly which had acquired its infection at the same time and from the same animal as the first unsuccessful, fly.

Clinical

LESTER (p 204) describes three types of sleeping sickness seen in N Nigeria. The commonest often constituting more than 95 per cent. of cases seen, is a mild form in which equilibrium is established with the patient in poor condition and with a lowered resistance to other diseases which is at the root of the depopulation which has occurred. In the second type toxæmia is the salient feature and oedema is common the patients die without any sign of involvement of the nervous system. The third is the classical type with the characteristic sleeping stage. The first type usually preponderates but in the more virulent epidemics the second and third are relatively more numerous.

In diagnosis the method of the Foréami staff (p 656) is that gland palpation is always performed by Europeans and the examination of gland juice and blood by native microscopists under constant supervision. DE BRAUWERE (p 655) states that the Foréami staff performed lumbar puncture on 93 to 95 per cent. of the definitely diagnosed cases and gives a table of the cell counts.

GUIBERT and BOSCH (p. 216) found *T. gambiense* in the bone marrow of 29 of 30 untreated patients in 1 of 6 suspected patients and in 1 of 2 previously cured but recently again ill. Bone marrow examination is therefore of diagnostic importance. JOSPIN and GALLAIS (p 217) found trypanosomes in the sternal marrow of a patient whose blood was negative. THIROUX in comment however points out that injection of *Cercopithecus* is a more delicate test of blood than triple centrifugation and that apparently negative blood may thus be shown

trypanocidal properties. He (p. 680) shows that the fact that trypanosomes become photosensitive after exposure to acriflavine can be used quantitatively to determine the quantity of acriflavine in the trypanosomes or the medium.

Drug Resistance

In a study of drug resistance LOURIE and YORKE (p. 221) found four types of resistance in *T. rhodesiensis* (a) resistance to the aromatic compounds of arsenic and antimony and to acriflavine, (b) superadded tartar emetic resistance (c) resistance to Bayer 205 and (d) resistance to the amidine and guanidine compounds. Each of these is specific for its own group of chemical compounds.

From their work on drug resistance VAN HOOFF *et al* (p. 211) conclude that resistance to Bayer 205 is an unstable character which progressively diminishes on mechanical passage through animals of the same or different species and even completely disappears on cyclical transmission through *G. palpalis*. In the epidemiology of Gambian sleeping sickness it is considerably less important than the corresponding arsenic-resistance.

Two arsenic-resistant strains of trypanosomes were isolated in the Belgian Congo (p. 656). Others were reported but in the absence of detailed study it is impossible to be certain that these were cases of true arsenic-resistance. From N. Nigeria (p. 736) it is reported that four 2 gm. doses of trypanamide did not increase the resistance of the parasite [*T. gambiense*] to the drug in two patients from whom isolation was effected both before and after treatment.

LAURON and LAGOUSKY (p. 212) have found that a strain of *T. annamense* made resistant to arsenic is less sensitive to antimony than a normal strain. LAURON (p. 212) shows that the natural chemoresistance of *T. congolense* is not identical with the artificial chemoresistance of *T. annamense*.

Prevention.

LESTER (p. 672) writes of the policy of compulsory surveys and mass treatment in N. Nigeria. In addition anti-tsetse clearing by local communities and the removal and in some instances concentration of populations are essential and are the only certain methods of control. The establishment of field sleeping sickness dispensaries has played a big part in reducing the infection rate and in controlling the disease. In many localities once the incidence has been diminished by mass treatment dispensaries can cope with relapsed cases and fresh infections, and it is hoped that mass treatment will only be required occasionally in a few areas.

Discussing the decrease in the *G. swynnertoni* population which results from densification of woodland vegetation in East Africa when fire is excluded, NASH (p. 224) points out that in N. Nigeria the climatic conditions are so severe that such densification is needed by tsetse for survival. He therefore advises that densification by fire exclusion should not be practised generally and should only be allowed in forestry reserves where *G. morsitans* does not occur. Streams should be cleared and fuel plantations should be sited between streams and not within $\frac{1}{2}$ mile of them. Densification, however, may be successful in the cooler and moister climate of S. Nigeria where the flies prefer more open conditions. Deforestation and soil erosion are serious problems but there need be no real conflict between woodland conservation and

insect control provided that care is taken in the siting of forestry reserves and fuel plantations.

BROWN (p 223) in Uganda shows that the fly population in all rivers is small and abrupt changes in water volume by destroying pupae will never allow it to increase. *G. palpalis* can seldom leave the river beds and narrow strip debushing can therefore alter conditions so as to prevent its further existence. He gives details of strip clearing for rivers and roads, points out that river clearing should progress downstream to prevent the fly from being driven into the maze of headwaters and emphasizes the importance of hand catching. Livestock act as a biological barrier and should not be removed but rather introduced deliberately. Antypol may be used to protect clearing gangs and 1.0 gm. will protect for 3 months. STILES and SOUTHWELL (p 740) report on the block method of reducing *G. palpalis* on the shore of Lake Victoria. Hand catching collection of pupae and trapping were used but the latter was ineffective. Hand catching was the most economical. The decrease in *G. palpalis* varied from 50 to 90 per cent and even with high densities of fly hand catching can be employed successfully. The flies can cross open water 400 yards wide.

CHORLEY (p 673) discusses controlled game destruction and the creation of fly free buffer zones in S Rhodesia showing that these have now passed beyond the experimental stage and can be applied to any area on the periphery of a fly belt wherever land is required for development. Judicious controlled game destruction may be combined with the establishment of game sanctuaries in areas cleared of fly.

Trypanosomiasis of Animals and Experimental Work

BROWN and BROOM (p 217) describe the red cell adhesion test as a specific serological reaction. Trypanosomes immune serum complement and human red cells are incubated together and if the serum is homologous the red cells become firmly adherent to the trypanosomes. Standard concentrations of red cells and trypanosomes are necessary to obtain constant results and agglomeration and lysis of the trypanosomes may take place even if the red cells are not suitable as indicator (as is the case with certain human red cells). Certain bacteria adhere to sensitized trypanosomes while others fail to do so.

BROWN (p 218) found that in mice the electrical charge of polymorphic trypanosomes undergoes a reversal of sign if relapse occurs after spontaneous cure. The nature of the host apparently has a definite effect upon the sign of the charge of trypanosomes. A simple test is described for determining the sign positively charged trypanosomes becoming adherent to the red cells. BROOM and BROWN (p 660) show that when positively charged *T. brucei* are taken into *G. morsitans* one reversal of sign takes place in the gut and a second in the salivary gland. With negatively charged trypanosomes the only reversal is in the salivary glands.

NICOLLE and SMOVA (p 746) have studied the blood sedimentation rate in animals infected with trypanosomes. YORKE suggests that the increased rate may be due to the autoagglutination which occurs at low temperatures.

Discussing the passively transferable antibodies responsible for inhibition of reproduction (ablastin) and trypanocidal activity TALIAFERRO (p 214) shows that these occur in *T. duttoni* infections o

mice as well as in *T. lewisi* infections of rats. Group reactions are described.

CULBERTSON and KESSLER (p. 750) found that rats, especially older rats, can be rendered completely resistant to *T. lewisi* by the repeated injection of formalized homologous antigen. Agglutinins are developed to a titre roughly related to the degree of resistance acquired. CULBERTSON (p. 751) found that treatment with Bayer 205 was more effective in older than in nursing rats infected with *T. equiperdum* and concludes that the difference is probably related to a difference in the phagocytic capacities of the cells at different ages. He (p. 752) shows that with trypan blue there is a difference in phagocytic capacity between young and old rats the latter being the more active. This may be correlated with the greater resistance of the old against *T. lewisi*.

He further (p. 751) shows that resistance against *T. lewisi* may be transmitted from a passively immunized mother rat to the young she nurses and depends on an antibody similar to that in the blood of the parent. He (p. 751) shows that rats can be immunized with antiserum administered *per os* during the usual nursing period but that towards the end of that period the method becomes progressively less effective.

BIRKS (p. 747) shows that there is considerable difference in the susceptibility of individual animals to *T. congolense* and that different strains of the parasite vary in pathogenicity.

FRENCH (p. 747) discusses carbohydrate metabolism in *T. congolense* and *T. brucei* infections, and (p. 215) describes the effect of *T. congolense* and *T. brucei* on some inorganic blood constituents.

PARKIN (p. 219) records instances of spontaneous cure in infections with *T. congolense* and *T. vivax* but none has been observed with *T. brucei* or *T. equiperdum*.

DELEDMITRIOU (p. 747) obtained satisfactory results with surfen C in cattle infected with *T. congolense*. VAN SACKHEM (p. 748) also considers it to be a drug of great value, but VAN REINSBURG (p. 222) reports unfavourably on the treatment with surfen C of bovines and ovines infected with *T. congolense*.

VAN DEN BRANDEN (p. 743) obtained temporary blood sterilization in rats infected with *T. brucei* by exposing them to the vapour of Bayer 205.

POP and BUDAC (p. 745) conclude from their work with anticomman that it acts directly on trypanosomes and not by producing hypoglycaemia, thus supporting the work of LORKE and his colleagues on nthalin.

LAGODSKY (p. 743) found that a prophylactic dose of an antimonial had no preventive action against an arsenic resistant strain of *T. namensis* but that it definitely attenuated its virulence and pathogenic power.

HOARE and BROOM (p. 661) find it possible to differentiate *T. uniforme* from *T. vivax* even in mixed infection, by measuring the lengths of 100 individuals as a minimum.

MANZOZZI TORINI (p. 745) describes a centrifugation method for the separation of trypanosomes from the blood and has studied the catabolic activity of *T. cruzi* emulsions prepared in this way.

Further work on animal trypanosomiasis has been abstracted during the year but is not included in this Summary since it has no immediate practical application to human disease.

CHAGAS'S DISEASE.

Epidemiology

TALICE and his co-workers (pp 225-226) have recorded cases from parts of Uruguay hitherto believed to be uninfected and MAZZA *et al* (p 752) report 68 from the Chaco of whom 44 were under the age of 10. Of 506 *T. infestans* collected from the houses 184 were infected.

Transmission

CARDOSO (p 228) studied the transmission of Chagas's disease. The trypanosomes can pass the intact conjunctiva, vaginal, buccal and rectal mucous membranes and lightly scarified skin but did not in his experiments pass through intact skin. Infection by bite of infected *T. infestans* was unsuccessful except in one experiment and in this case the author thinks that it may have been due to regurgitation of trypanosomes from the intestine but YORKE in comment suggests that the mouth parts of the bug may have become contaminated from faeces shortly before the experiment commenced. BRUMPT (p 753) also failed to infect a young rat by the bite of 50 Reduviid nymphs the dejecta of which were infective for rats of the same age thus confirming the generally accepted view that the usual mode of infection is by infected excreta.

GASIC (p 229) found infection in *Triatoma* varying from 18.5 to 51 per cent. in Santiago Province, Chile. No disease was found in man or animals but the author has little doubt that it does exist in view of the high proportion of bugs infected and thinks that xenodiagnostic methods might reveal its presence. Crithidial and metacyclic forms of *T. cruzi* were found in the duodenum and rectum of *Euliatoma maculata* by DIAS and TORREALBA (p 229) infected in nature in S. America. FERREIRA and DEANE (p 754) in the Amazon estuary show that the faeces of infected *Clerada apicicornis* are infective. PIFANO (p 753) shows that *Psammolestes arthuri* a Reduviid of Venezuela though not yet found infected in nature is a potential transmitter.

DEANE and JANSSEN (p 754) found *Marmosa cinerea* a small opossum to be a natural reservoir in the State of Pará.

Immunity

CULBERTSON and KOLODNY (p 231) demonstrated that rats which have recovered from a *T. cruzi* infection are completely immune to reinfection. The serum of a recovered animal will not prevent but will modify infection in another and will temporarily reduce the number of trypanosomes when given as a treatment. KOLODNY (p 755) shows that a non-specific resistance to *T. cruzi* is developed in rats increasing with age. There is no specific serum antibody responsible for this and it is closely correlated with physiological maturation and endocrine function. Similar results were found when infection was induced *per os* (p 755).

Clinical

LOBO *et al* (p 228) give figures of the prevalence of endemic goitre in the Northern Argentine. Proportions varying from 15 to 45 per cent. of the general populations examined were found to be goitrous and in children the figures were still higher. Most of the swellings were small. This is an important record in view of the supposed association between thyroid enlargement and Chagas's disease which

may in fact be no more than accidental. TALICE *et al.* (p. 225) report a condition which they describe as acute congestive thyroiditis of trypanosomal origin during the early part of infection with *T. cruzi*. They (p. 226) describe a "septicaemic phase" of the disease in which general adenitis and slightly enlarged spleen were present.

Xenodiagnostic tests were found positive by DIAS (p. 230) in two patients 16 years after first infection.

Treatment.

TALICE *et al.* (p. 227) used a preparation "Sulfanil" Emul two tablets each of 0.3 gm., daily by mouth for 15 days in the treatment of a typical case, and consider it to have been highly beneficial.

C Wilcocks

LEPROSY

Prices of Abstracts in this Section

PEARCE (p. 328) discusses leprosy in N.W. China.

MUIR and CHATTERJI (p. 328) show the importance of contact and refer to the success of voluntary isolation in a village in Bengal.

MUIR (p. 328) points out the high incidence of leprosy in hot, low lying areas of Africa and attributes great importance in spread to dirty and promiscuous habits. In S. Africa the modification of the compulsory system to permit the release of uninfected and recovered patients has proved very successful in inducing patients to come for treatment. Compulsion is used in Basutoland, but in other countries is impracticable. The Urakoli system (Nigeria) of clinics in villages surrounding the settlement is commented on with approval. JOHNSON (p. 329) refers to the work of leprosy inspectors in Basutoland. Early cases now form 38 per cent. of admissions.

MALDONADO ROMERO (p. 330) gives details of a method of calculating the number of lepers in Colombia. GEORGE (p. 330) found an incidence of 3.6 per 1,000 in the municipality of Sotomayor, Colombia.

MARCHOUX (p. 331) discusses the conclusions which may be arrived at from the study of human and rat leprosy. Contact infection, long latency, individual resistance and spontaneous cure are mentioned.

COCHRANE *et al.* (p. 331) have succeeded in infecting monkeys with human leprosy material after splenectomy. BURKET and JARDYARD (p. 331) report apparently successful infection of a hamster by repeated feeding with leprosy material. MANALANG (p. 332) has attempted to evaluate the significance of segmented and granular forms of *Mycobacterium leprae* in a large number of lesions studied, but has not been able to arrive at a definite conclusion.

Complement fixation tests were found by SARDJITO (p. 332) to be ineffective in differentiating the *Sidik* bacillus (from a gluteal abscess) from the leprosy and tubercle bacillus. LIMA and ARANTES (p. 33) report success in cultivating *Mycobacterium leprae* in modified Santon medium. GAVRILOV and FISTER (p. 333) have cultivated the rat leprosy bacilli in animal tissue cultures.

GAVRILOV *et al.* (p. 333) conclude that vitamin deficiency may predispose guinea-pigs to infection with rat leprosy and GARDNER

(p 333) considers that in man deficiency of vitamins predisposes to leprosy infection and that vitamin B₁ is useful in treatment. MUIR (p 333) holds the view that natural resistance to leprosy is in proportion to the general health is low in children, but does not vary much in families or races. Acquired resistance may be systemic or local.

FUERTES and PERUCHENA (p 334) describe the morbid changes in the ulnar nerves of a case of mixed leprosy. STEIN (p 334) describes the hyperergic inflammatory changes extending to necrosis and supuration in the leprotic lesions during the course of the lepra reaction.

LARA (p 335) considers that the leprolin (lepromin) test has no value as an index of resistance of children over 1 year of age that it has no prophylactic value and may even act provocatively in such children. IGNAJO (p 335) records the results of the test in bacteriologically negative cases and LAGROSA (p 335) the results in bacteriologically positive cases. In the latter the results could not be correlated with the clinical changes. MENDES and GIL DE CASTRO CERQUEIRA (p 336) discuss this reaction. The preparation used must be standardized and the reaction is valuable in the estimation of local immunity. WADE (p 336) considers that lepromin is a better name than leprolin for the preparation used.

RADNA (p 336) regards the Witebsky-Klingenstein and Kuhn reaction as of diagnostic value in neural leprosy in which bacteriological examinations may be negative. Ho (p 337) considers that the Wassermann reaction is only positive when there are syphilitic lesions requiring treatment. SCHUJMAN (p 337) describes the histamine test to differentiate leprosy from syringomyelia.

DHARMENDRA (p 337) found a shift to the left in the Arneeth count in leprosy.

RYRIE (p 337) shows that plantar hyperalgesia to the heavy stroking of the sole of the foot with a hard instrument is an early sign of leprosy reactions and is associated particularly with progressive disease with bad prognosis. GERMOND (p 338) gives points of differential diagnosis between circinate tuberculoid leprides and polycyclic syphilides.

CAMPOS (p 338) discusses the benignity of certain forms of leprosy in children. RODRIGUEZ and WADE (p 338) trace the progress of cases of untreated neural leprosy observed for 5 years, and of two patients with major tuberculoid leprosy. RISHI (p 339) shows that relapse is more common in lepromatous cases than in neural, and that relapse after 10 years of arrest is rare.

MUIR (p 340) points out that Epidermophyton infections are troublesome complications of leprosy and are apparently predisposed to by the loss of power to sweat. The treatment advised is detailed.

PLUCHON (p 340) and BEAUDIMENT and RIVOALEN (p 340) discuss the neutralization of chaulmoogra oils necessary for injection purposes. The activity is not diminished. DUBOIS and RESSELER (p 340) describe the emulsification of chaulmoogra oil for intravenous injection. VESPOLI (p 341) describes his method of treating the ulcers of leprosy by percutaneous injections of creosoted chaulmoogra oil around the ulcers and a chaulmoogra dressing.

RADNA (p 342) describes the preparations he uses for intravenous and intradermal injections. NARAYAN (p 342) reports some success with neem oil. IRVINE (p 342) comments on the poor results obtained with M & B 693 and WHITCOMB (p 342) on rubrophene in the treatment of leprosy. COCHRANE *et al* (p 342) used foudadin with success in the febrile reactions of the lepromatous type of leprosy.

In the *International Journal of Leprosy* (p. 343) the results of the excision of solitary lesions in 19 instances are given. DHARMENDRA and CHATTERJI (p. 343) have excised 22 early neural lesions with some success during the as yet limited period of observation.

JOHANSEN (p. 343) regards fever treatment with the Kettinger hypertherm as most unsatisfactory—the disease is unaffected and the complications due to the fever may be severe.

LLERAS RESTREPO (p. 344) discusses preventoria for the healthy children of lepers. C IF

PEARCE (Robert) The Distribution of Leprosy in North West China.—*Leprosy Review* 1939 Oct. Vol. 10. No. 4 pp 201-206. With 1 map

This paper deals with the incidence of leprosy in the upper reaches of the Yellow River and the mountainous regions around it in patients seen at the China Inland Mission hospital at Kaolan (Lanchow) near the Great Wall. The patients included Chinese, Moslems and Tibetans, the disease being more severe in the first two races. Most of the patients came from the more inhabited river valleys. L. Rogers.

MUIR (E.) & CHATTERJI (K. R.) The Record of a Leprous Village.—*Leprosy Review* 1939 Oct. Vol. 10 No. 4 pp 208-220. With 2 figs.

This is an instructive survey and later re-survey illustrated by a map and family trees of a Bengal leprosy infected village. In 1934 there were 19 cases, 10 of them infectious among 77 people—an incidence of 24.6 per cent. The cases were mostly in families and in adjacent houses. One patient had apparently infected no less than 15 others. Propaganda secured the voluntary isolation of the 10 infective patients in rooms separated from the healthy where they had their meals. Five years later the village was re-surveyed, when 16 cases were found among 81 people 19.7 per cent. The seven original highly infective patients were still infective, but no new cases had arisen from them, so the home isolation appears to have been effective. L. R.

DHARMENDRA Re-Survey of the Village Dehlipur Hlr.—*Leprosy in India*. 1939 July Vol. 11 No. 3. pp. 67-92

MUIR (E.) Leprosy in East Africa.—*Internat J. Leprosy* Mamla. 1939 July-Sept. Vol. 7 No. 3. pp 383-394 With 1 fig (map)

This paper deals with the results of a tour in East Africa, and has already been abstracted. [See this *Bulletin* 1939 Vol. 36 p. 531]

L. R.

LEPROSY REVIEW 1940. Jan. Vol. 11 No. 1 pp. 1-74. With numerous illustrations.—Special African Number [MUIR]

This number records a tour through Nyasaland, Rhodesia, Belgian Congo, South Africa and Nigeria. The detailed account of leprosy

work in Africa is mainly of local interest but the most important points are summarized in an introductory note

Leprosy is common in all parts of Africa except in dry deserts inhabited by nomadic tribes. In Southern Central Africa it is most common in the hot low-lying moist areas along Lake Nyasa and in the Zambesi basin with a preponderance of open lepromatous cases in the former area, although the cases are more numerous in the latter. This the author attributes to dirty and promiscuous habits favouring numerous infections while in the cleaner Nyasaland people only those with low resistance develop a more severe type.

In South Africa a severe type is seen in Europeans although the frequency of the disease is decreasing among them. Since the compulsory system has been modified to allow uninfected and recovered patients to be released good progress has been made. All contacts of admitted lepers are now examined regularly to detect early infections. The Emjanyana Leper Institution in the Transkei is now so popular that more than a third of the admissions are voluntary and the patients insist on compulsory treatment with the result that 41 per cent of the South African discharges in 1938 were from among the 29 per cent of cases in this settlement. The number of cases in the South African institutions has only varied during the past twenty years from 2,265 to 2,374 but by June 1938 4,502 cases had been discharged but kept under observation for several years and 2,738 had been released from such surveillance as having recovered. The South African Union spends between £40 and £50 on each of its segregated lepers and the author concludes that there seems little doubt that if the present system is persisted with it will succeed in the end.

Basutoland also has a compulsory system of an expensive nature a feature of which is the training of leprosy inspectors to search out the cases. Here again the measures are reported to be proving gradually effective.

In other British areas of Africa the financial position precludes compulsory segregation but work in Nigeria especially shows that a great deal is being done at small expense through the co-operation of missions with the government. The Uzuakoli Leper Settlement has recently extended its work by establishing clinics in the surrounding villages where sanitary measures are also taught and leprosy relief work is being gradually extended over an ever widening area, and at a low cost with the help of the Native Administration and of the British Empire Leprosy Relief Association. Dr Muir's African tours are doing much to improve the standards of work throughout the vast leprosy areas of British Africa.

L. R.

BASUTOLAND ANNUAL MEDICAL AND SANITARY REPORT 1938
[DYKE (H. W.) P.M.O.] Appendix IV pp 50-56—Annual
Report on the Leper Settlement at Botsabelo, Basutoland, for the
Year ending 31st December, 1939 [JOHNSON (W. B.) Supt.]

The Annual Report of the Botsabelo Leper Settlement of Basutoland for 1938 shows an increase in the number of patients from 669 to 704 due to the work of two additional leprosy inspectors and a decrease of discharges and desertions. The small increase under these circumstances is regarded as a definitely encouraging feature. Early cases of 1 to 12 months duration formed 33 per cent. of the admissions.

A recent medical board advised that a considerable number of the patients might be discharged without danger to the community for some 14 per cent. are infirm "burnt out" cases. L. R.

MALDONADO ROMERO (Dario) La incidencia de la lepra en Colombia. [Incidence of Leprosy in Colombia].—*Rev Colombiana de Leprologia* Bogota 1939 Oct. Vol. 1 No. 3. pp. 186-189

The number of lepers in Colombia is not known various guesses have been made from time to time and spoken of as "estimates" but the calculations were more than a little arbitrary. First came an obvious under-estimate from numbers reported to the sanitary authorities. Thus, Gabriel Castañeda in 1889-91 noted 2,325 cases of whom 740 were isolated. Montoya and Florez in 1905-06 gave 4,304 of whom 1,638 were isolated. Secondly multiplying, by a factor more or less arbitrarily chosen, the number of lepers in isolation some double this number others choose 4 and pessimists elect to multiply by 8. Thirdly estimate is made by comparing the general with the annual incidence [which seems begging the question, as the former is the sole point at issue]. The author quotes Professor SOUZA ARATJO as taking the line that any patient unrecognized infects 6 persons in 20 years and the average time of 7,897 isolated was just over 12 years before they were admitted, or about 95,000 infective years" at the rate of 6 in 20 years this would give some 28,000 [the author gives this as 2,868 or only one-tenth of the true figure]. He concludes that in addition to those in isolation there are 1,729 "obscure" cases (cerrados macritos) and 7,170 probable or 16,798 in all. The figure of 7,170 as "probables" is based on the assumption that 2,868 [wrongly calculated as stated above] is 40 per cent. of the total. During 1938 there were 1,062 registered cases. The 1939 census gave a population of 8,701,816 and on his calculations as given the incidence would be 1.92 per thousand a little over half (57.3 per cent.) are said to be registered. [This method would seem to be even more "arbitrary" than the others it is reviewed here because anything coming from Professor ARATJO deserves serious consideration. It may be that the method needs further amplification.] H H S

GEORGE (J V) Estudio sobre el foco leprogenico de Sotomayor [Sotomayor an Endemic Centre of Leprosy].—*Rev Colombiana de Leprologia* Bogota 1939 Oct. Vol. 1 No. 3. pp. 198-202

In the municipality of Sotomayor leprosy is endemic. Six sections of the town were investigated with populations varying from 105 in Pisanda to 1,079 in the Central. In the latter ten cases were found, another twelve in Pangus among 834 inhabitants. In all six sections lepers were found, 41 in the whole district among a population of 11,445 or 3.6 per mille. The cases are increasing in spite of efforts at isolation, and dietary deficiency is believed to be an important and contributory cause. H H S

COCHRANE (Robert G) Recent Advances in Epidemiology Diagnosis and Prevention of Leprosy.—Reprinted from *Jl Christian Med Assoc of India Burma and Ceylon* 1939 July 17 pp. With 9 figs on 5 plates. [34 refs.]

MARCHOUX (E) La lèpre à la lumière de la pathologie comparée. [*Leprosy in the Light of Comparative Pathology*].—*Rev d'Immunologie* Paris 1939 Nov Vol 5 No 6 pp 523-534 [76 refs.]

In this paper the author discusses the light thrown by a study of rat leprosy on the pathology of the human form of the disease and comes to the following conclusions. Both diseases present characters in common with identical morphology of the causative bacilli neither of which has yet been cultivated with certainty. In both there is the same mode of transmission through contact. The leprosy bacillus is more dangerous than that of tuberculosis and is spread as easily for as few as five bacilli well placed suffice to cause the disease. The incubation period or at least the time required for the multiplication of the organisms is long and resistance to the disease varies with the individual. The bacilli may remain indefinitely within one or more histiocytes and some favourable influence may cause them to perish or disappear. Spontaneous cure occurs doubtless much more often than is thought to be the case when the infection is localized and the recipient is resistant to infection. L. R.

COCHRANE (R. G.) PANDIT (C. G.) & MENON (K. P.) A Preliminary Note on Inoculation of Monkeys with Human Leprosy Material after Splenectomy.—*Internal J. Leprosy* Manila. 1939 July-Sept. Vol 7 No 3 pp 377-381

The authors were led by the reports of ADLER that he had infected Syrian hamsters with lepra bacilli after removal of their spleens [this *Bulletin* 1938 Vol. 35 p 293] to try the same plan with monkeys. After the splenectomy subcutaneous nodules removed from leprosy patients were fixed to the splenic stump or omentum. Of the six animals that survived three were also reinoculated with leprosy material and one of them may be assumed to have been actually infected but only one of the other two developed a small lesion at a distance from the abdominal incision which subsequently healed as far as was evident at the time of reporting. In the other three the first inoculation was performed without splenectomy and reinoculation was done later together with splenectomy and in one no infection was found two and a half months after the initial inoculation. The other two died three and five days respectively after the splenectomy one was completely negative and the other showed spread in the viscera. The results were therefore inconclusive but reveal the possibility of individual resistance. L. R.

BURNET (Et.) & JADFARD (H.) Transmission de la lèpre humaine au hamster par voie digestive. [Transmission of Leprosy Orally to the Hamster].—*Bull Acad. Méd.* 1939 Nov 7 Vol. 122. No 31 pp 383-388. With 3 figs.

The authors report apparently successful infection of a hamster by repeated feeding with leprosy material. Daily quantities of 2 cc. of skin and spleen very rich in lepra bacilli were administered orally for twelve days. Nine months later the animal appeared to be ill and death ensued two weeks later when an autopsy was immediately carried out and minute granulations were found in the lungs spleen liver kidneys and in small meso-peritoneal glands near the duodenum. Sections revealed large numbers of acid fast bacilli some in bundles as

seen in leprosy lesions. Unfortunately by mistake the body of the animal was thrown away without inoculating animals to exclude tuberculosis.
L. R.

MANALANG (J.) The Morphology of *Mycobacterium leprae*. Third Report.—*Philippine Islands Med Assoc.* 1939 Aug Vol. 19 No 8. pp 467-475

This paper reports the results of a laborious investigation into the relative proportions of solid segmented and granular forms of the leprosy bacillus in different types and stages of cases with a view to determining if the segmented and granular forms are of a degenerative nature or rather processes of growth and proliferation. No less than 519 lesions in 257 patients were examined microscopically and the following conclusions arrived at. As the lesions advance the segmented and granular forms taken together tend to decrease while the percentage of supposedly retrograde changes taken together tend to increase. In the previous report of readmitted relapsed cases the percentages of solid forms decreased and the percentages of granular forms increased in the skin lesions as these became more advanced and extensive (from C₁ to C₃). The finding in the present report as the lesions and the disease became advanced are not in accord with the previous observations. So far as the present observations are concerned, the interpretation of the granular forms of *My leprae* and the significance of the predominance of a certain form in a lesion remain unsettled."
L. R.

SARDJITO. Complementbindingsproeven met alcohol- aether acetone-extract van zuurvaste bacillen en sera van leprapatiënten. [Complement Fixation with Alcohol, Ether and Acetone Extracts of Acid Fast Bacilli and Leprosy Sera.]—*Acta Leidensia (Scholae Med Tropicae)* 1939 Vol. 14 pp 200-210

Complement fixation tests with the cultures obtained from a gluteal abscess (*Sidik* bacillus) had indicated a closer relationship of this organism to the leprosy bacillus than to the tubercle bacillus [this *Bulletin* 1937 Vol. 34 p. 911]. Further tests have now been applied to determine how far alcohol, ether or acetone extracts of the leprosy bacillus the *Sidik* bacillus and the tubercle bacillus were related to one another. Details are given of the preparation of the several antigens. The sera of 18 cases of skin leprosy 28 of nerve leprosy and 5 of mixed leprosy were used. As controls 10 tuberculous sera were employed, as also were normal sera. Where the extracts appeared to give positive reactions, it was the alcoholic extract which was superior to the other two. A number of tables of the experiments performed are set out but the author himself replies in the negative to the question whether the tests had served to provide quantitative differences between leprosy *Sidik* and tubercle bacilli.
W F Harvey

LIMA (J P Carvalho) & ARANTES (Maria). Cultura do bacilo da lepra. [Cultivation of *Myc leprae*.]—*Rev Brasileira Leprologia.* S Paulo. 1939 Dec. Vol. 7 No 4. pp 391-394. With 3 coloured figs. on 1 plate. English summary

"We have tried cultivating in modified Sauton's medium, *Mycobacterium leprae* from 36 clinically and bacteriologically verified cases of leprosy. In 30 cases there was an initial growth from the 4-6th day. In

4 cases, growth was variably belated and twice completely negative results ensued. In 3 cases subcultures were possible during 5 months

Macroscopically the growth presents pearl coloured clots with gray pigmentation and delicate veils on the surface. Successive microscopic examination brought to evidence different phases of the evolution of the organism thus supporting the opinion of those who admit a cycle in the evolution of *Mycobacterium leprae*

As it is, one is not able yet to reach a definite conclusion, but these results compel us to proceed with our experiments

GAVRILOV (W) & FESTER (A) Mme. Le bacille de Stephansky et la culture de tissus des divers animaux de laboratoire. [Rat Leprosy Bacillus Tissue Cultures.]—*Ann Soc Belge de Méd Trop* 1939 Sept. 30 Vol. 19 No 3 pp 367-376 With 6 plates

The authors report ten per cent. of successes during 4-6 months trials of animal tissue culture media for the cultivation of Stéfansky's bacillus which obtained access to the cells and for long preserved a normal appearance within them especially in the tissues of the rat itself. Less success was obtained with the tissues of guineapigs and less still with fowl tissues

L. R.

GAVRILOV (W) DUBOIS (A.) & FESTER, Mme. Influence de l'avitaminose sur l'infection des cobayes par le bacille de Stephansky [Avitaminosis in Rat Leprosy Infections of Guineapigs.]—*Ann Soc Belge de Méd Trop* 1939 Sept 30 Vol 19 No 3 pp 361-366 With 3 plates.

The authors conclude from their experiments that an abnormal diet especially a vitamin deficiency may predispose to the infection of guineapigs injected with the rat leprosy bacillus

L. R.

GMINDER (Ernst) Vitamin B₁ und Lepra [Vitamin B₁ and Leprosy]—*Deut Med Woch* 1939 Aug 25 Vol 65 No 34 pp 1346-1350 [32 refs.]

The author discusses the predisposing influence of avitaminosis and refers to the occurrence of polyneuritis in both beriberi and in nerve leprosy. He records that the administration of betaxin in eight cases of generalized leprosy was followed by great improvement in one improvement in five a stationary condition in two with a return of the anaesthesia. The use of vitamin B₁ was sometimes followed by improvement in the sensory symptoms. He considers that deficiency of vitamins predisposes to leprosy infections.

L. R.

MUIR (E) Resistance and the Typing of Leprosy Skin Lesions.—*Leprosy Review* 1939 Oct. Vol 10 No 4 pp 221-225 With 1 fig

This note again emphasizes the importance of the resisting powers of the patient on the development of leprosy lesions. Natural resistance

iii. In a similar manner this paper deals with repeated leprolin tests over a period of two years in 105 active bacteriologically positive cases mostly cutaneous ones. At the first test 79 per cent. were negative, but at the fourth test 80 per cent. were positive. The reactions could not be correlated with the clinical changes as there was a progressive increase in the number of cases worse. The initial leprolin reaction however appears to have a limited prognostic significance.

L. R.

MENDES (Ernesto) & GIL DE CASTRO CERQUEIRA. Estudos experimentais sobre a lepromina. [Experimental Study of Lepromin.]—*Rev. Brasileira Leprolgia*. S. Paulo 1939 Sept. Vol. 7 No. 3. pp 245-293 English summary

This article gives an account of the effects of varying doses of lepromin [leprolin] inoculated into non-lepers as well as the leprous and in different parts of the bodies of the latter and compares the results of lepromin with those of tuberculin. The authors find that lepromin is made up of a filterable and a non-filterable constituent and it is the latter which is active in bringing about the lepromin reaction. With different preparations the results varied much, though the same degrees of dilution were employed. In other words, if comparable results are to be obtained, the lepromin used must be standardized. Again, the degree of reaction, i.e. the diameter of wheal produced, varies also with the site of injection. Those with tuberculoid leprosy react to a less degree than the macular cases, and at the edge of the lesion there may be no reaction at all. Macular lesions may give a strong reaction, while in sites where the bacilli may be seen microscopically there may be absence of reaction. The authors regard the lepromin test as valuable in gauging local immunity

H H S

WADE (H. W.) "Leprolin vs "Lepromin."—*Internat. J. Leprosy* Manila. 1939 Apr-June. Vol. 7 No. 2. pp 272-273

In this short note Wade discusses the nomenclature of the preparation used in the Mitsuda test, pointing out that it consists of whole bacilli plus tissue elements and is therefore not similar to tuberculin. The term lepromin has the advantage of signifying the nature of the material of which it is made, namely leproma tissue and should, in the author's opinion, be substituted for the less exact leprolin.

[In this number of the *Tropical Diseases Bulletin* both terms are employed as the authors have used them, but both apply to the same material, see LARA *et al* and MENDES and GIL DE CASTRO CERQUEIRA above.]

C IF

RADWA (R.) Sur la réaction de Witebsky-Elingenstein-Kuhn dans la lépre. [Witebsky Reaction in Leprosy]—*Ann. Soc. Belge de Méd. Trop.* 1939 Sept. 30. Vol. 19 No. 3. pp. 407-412.

The author reports the results of this test in 133 lepers, 15 children of lepers and in a few syphilis and yaws patients and healthy controls. He obtained positive results in all the lepromatous cases, in 98 per cent. of neural, but in only 35.2 per cent. of tuberculoid ones while in over 90 per cent. of the controls it was negative. He therefore regards the

test as of diagnostic value in neural cases in which bacteriological examinations may be negative. Positive reactions were also obtained in 3 of the 13 children of lepers. L R

RADNA (R.) Sur les réactions sérologiques syphilitiques chez les lépreux [Wassermann Test in Leprosy Cases.]—*Ann Soc Belge de Méd Trop* 1939 Sept. 30 Vol. 19 No 3 pp 413-421

A study of 153 leprosy and 61 non leprosy cases indicated that positive results in leprosy cases usually became negative after anti-syphilitic treatment the author therefore concludes that positive reactions are only contained when syphilitic complications requiring specific treatment are present L R

SCHUJMAN (Salomon) Un nuevo signo diferencial entre syringomyelia y lepra nerviosa. [A New Test to Differentiate Leprosy from Syringomyelia.]—*Rev Brasileira Leptologia* S Paulo 1939 Dec. Vol. 7 No 4 pp 405-410 With 8 figs. (7 on 3 plates) English summary (9 lines)

In 1931 J RODRIGUEZ and F C. PLANTILLA described a test denominated the *histamine test* in which the local injection of a dilution of histamine into a site with intact nerves is followed in 10-15 seconds by a flush of 3-4 mm diameter spreading considerably in half a minute and by a weal in 5 minutes or less. This is the sequence in a healthy subject or in one with intact peripheral nerves (and hence in syringomyelia, a disease where the cutaneous anaesthesia is of central origin) In leprosy of the macular-anaesthetic type where the nerves are involved, there is no such response

[The author does not, either in the text or list of references, make any mention of RODRIGUEZ and PLANTILLA. Moreover in these days of scientific advance a test 9 years old can hardly be described as new See also this *Bulletin* 1932 Vol. 29 p 268 1933 Vol. 30 p 560 1935 Vol. 32, pp 335 858.] H H S

DHARMENDRA. Arneth Count in Leprosy—*Leprosy in India* 1939 Oct. Vol. 11 No 4 pp 132-133

In this note the author records the results of the Arneth count in 70 cases of leprosy He confirms the finding of Sadi de Buen in 1916 that there is a shift to the left in this disease and found no appreciable differences in the degree in nerve and lepromatous cases respectively L. R.

DHARMENDRA & DR (N K.) Blood Cholesterol in Cases of Leprosy—*Leprosy in India* 1939 July Vol. 11 No 3 pp 83-87 [10 refs.]

RYBIE (Gordon A.) Plantar Hyperalgesia and the Prognosis and Treatment of Leprosy.—*Internat J Leprosy* Manila. 1939 July-Sept Vol. 7 No 3 pp 349-360 With 1 fig

The author describes plantar hyperalgesia as an early sign of leprosy reactions and as of importance as a guide to prognosis and treatment. It is elicited by heavy stroking of the sole of the foot after first ascertaining that tactile sensation is preserved, with a hard instrument

10.89 per cent. had relapsed but the rate was only 8.5 per cent. in neutral against 18.0 per cent. in lepromatous cases. The chances of relapse beyond ten years of arrest appear to be small. L. R.

Muir (E.) Fungus Infections in Leprosy.—*Leprosy Review* 1939 Oct. Vol 10 No 4 pp 206-208.

This note points out that Epidermophyton infections are troublesome complications of leprosy. They appear to be predisposed to by the loss of the sweating power which is inimical to fungal growths. As PACK has suggested this may be counteracted by the application of acetic or lactic acid or fatty acids. The following prescription is advised. Pure carbolic acid 2 parts ichthyol 2 parts, Tr. Iodi. 2 parts glycerine 4 parts and rectified spirits 4 parts to be painted on the lesions and repeated after a few days if necessary. L. R.

Lowy (J.) Leprosy and Tuberculosis.—*Indian Med. Gaz* 1939 Aug. Vol 74 No 8 pp 452-457.

Overduin (M. J.) Pseudo-Raynaud's Disease in Leprosy.—*Internal J. Leprosy* Manila 1939 July-Sept. Vol 7 No 3 pp 305-309 With 3 figs on 1 plate.

Pluchon (J. P.) Note sur un procédé de déacidification de l'huile de chanmoogra injectable (Deacidification of Chanmoogra Oil).—*Ann de Méd et de Pharm Colon* 1939 Jan.-Feb.-Mar Vol 37 No. 1 pp 220-224. With 1 fig.

BRAUDIMENT (R.) & RIVOALEN (P.) La neutralisation des huiles de chanmoogra.—*Ibid* 1939 July-Aug-Sept Vol 37 No. 3 pp 750-763 [20 refs.]

The first of these papers is a technical one which should be consulted in the original, on the methods of deacidifying chanmoogra oils.

The second deals with the results obtained in treatment with such oils, which should show less than 6 per cent of acidity for oral use, under 3 per cent. for intramuscular or hypodermic use and less than 0.8 per cent for intravenous injection. Neutralization does not diminish the activity of the oil. The following is a simple way of obtaining a neutralized oil suitable for any method of administration. First add a small handful of deoecated sodium sulphate, shake and allow to stand for half a day before filtering. The oil is thus nearly freed from contained water. Then add a large excess of sodium carbonate and shake frequently during several days. After about twelve hours rest decant and filter through ordinary filter paper. The acidity is thus reduced to between 0.1 and 0.5 per cent. and the oil now keeps well. L. R.

DUBOIS (A.) & RESSLER (R.) Emulsion d'huile de chanmoogra. Préparation. Tolérance par voie veineuse chez les animaux. [Preparation of an Emulsion of Chanmoogra Oil].—*Ann Soc Belge de Méd Trop* 1939 Sept. 30 Vol. 19 No 3 pp 355-360.

The authors have emulsified chanmoogra oil with a solution of caustic potash according to the following formula. H₂O 10 cc. the oil 10 cc glycerine 10 drops, KOH 2 per cent 20 drops. Shake for

two or three hours. Microscopically the oil droplets ordinarily do not exceed 10-15 μ but may reach 25-50 μ on prolonged standing so brief shaking is necessary before use. The emulsions are toxic for a small animal such as a rat in doses exceeding 0.5 cc per kilo but are well tolerated in the usual doses for man and their use was received with favour by the indigenous patients.

L R

LABERNADIE (V) Les traitements de la lèpre de 1934 à 1938. [The Therapy of Leprosy from 1934 to 1938.]—*Rev Méd Française d'Extrême-Orient* 1939 May & Nov Nos. 5 & 9 pp 569-580 1149-1165 [173 refs.]

BURSCHEKES (Karl) Ueber einige Ester der Chaulmoogra und der Hydnocarpussäure sowie des Chaulmoogryl und des Hydnocarpylalkohols III Mitteilung [Esters of Chaulmoogra and Hydnocarpus Acids and Alcohols.]—Reprinted from *Berichte d. Deut. Chemischen Gesellschaft* 1939 Vol. 72, No. 5 pp 1012-1016

ARNOLD (Herbert) Rhodanhaltige Derivate der Hydnocarpus- und der Chaulmoogra-säure. [Sulphocyanide-containing Derivatives of Hydnocarpus and Chaulmoogra Acids.]—Reprinted from *Arch d. Pharm. u. Berichte d. Deut. Pharm. Gesellschaft* 1939 5 pp

VESPOLI (Miguel) As úlceras leprosas pathogenia e tratamento pelas infiltrações intradérmicas. Modo de ação geral e local dos preparados chaulmoogrícos. [Leprotic Ulcers, their Pathogeny and Treatment.]—*Rev. Brasileira Leprologia* S Paulo 1939 Sept. Vol. 7 No. 3 pp 295-307 With 14 figs. on 7 plates.

The author does not furnish any fresh information regarding the pathogeny of ulcers in leprosy but details his treatment and presents contrasting photographs of patients before and after the treatment which are very instructive. The details of his method are as follows — The ulcer is well cleaned and then with a syringe he injects a 4 per cent. creosoted ester of chaulmoogra oil in a double row 1 cm. apart of percutaneous insertions [presumably into the deeper layers of the skin] the inner row 0.5 cm. from the edge of the ulcer and the insertions 0.5 cm. apart. The ulcer is covered by gauze soaked in chaulmoogra oil heated to make it more fluid. This covering is renewed daily and the infiltration fortnightly. The illustrations show an ulcer of the outer ankle 8 cm. in diameter healed in 22 days another involving the outer half of the right dorsum of the foot and lower part of the leg healed in five weeks others deeper though smaller took up to 54 days.

H H S

SANJUÁN (Alfonso) La simpatectomía lumbar en el tratamiento de los perforantes plantares de la lepra. [Lumbar Sympathectomy in the Treatment of Perforating Ulcers of Leprosy.]—*Rev. Colombiana de Leprologia*, Bogotá. 1939 Oct. Vol. 1 No. 3 pp 151-158 With 3 figs.

RADXA (R.) Contribution au traitement de la lèpre le traitement par injections endoveineuses et endodermiques de fortes doses d'huile de chaulmoogra et de ses dérivés. [Intravenous and Intradermal Injections of Large Doses of Chaulmoogra Preparations].—*Ann Soc. Bêge de Méd Trop* 1939 Sept. 30 Vol. 19 No 3 pp 393-405

The preparations reported on in this paper are for intravenous use a mixture of 7 parts of chaulmoogra oil and 3 parts of a 3 per cent. solution of gynocardate of soda according to the formula of Perrier and for intradermal use chaulmoogra oil with 2 per cent. creosote. Neither induration of the veins nor general reactions occurred. A preparation called Graumannyl B was also used by both methods. Good results and relatively rapid improvement even in lepromatous cases were obtained. L. R.

NARAYAN (J S) Neem Oil in the Treatment of Leprosy.—*Leprosy in India* 1939 Oct. Vol 11 No 4. pp 128-131

This Indian oil has previously been used in leprosy with variable results but was given an adverse report by E. Mura. The present author used it in sixteen cases by the intradermal and intramuscular methods and reports clinical improvement in six of the sixteen cases with a decrease in the number of lepra bacilli found in the lesions.

L. R.

IRVINE (Clive) M. & B. 693 in Leprosy [Correspondence].—*East African Med J* 1939 Sept. Vol 16. No 6. pp 231-232.

In a letter the author records a trial of M. & B. 693 in twelve patients with negative results. All but one suffered from giddiness and headache after three grammes daily and although the dosage was reduced to one-half all but two refused to continue the drug. L. R.

WHITCOMB (E. W) Rubrophens in the Treatment of Leprosy.—*Leprosy in India*. 1939 July Vol. 11 No. 3 pp 96-100

The extensive use in extrapulmonary tuberculosis of rubrophene (tri-methoxy-dioxy-coutritan) led to its trial for three months intravenously in 78 leprosy patients with negative results as regards the symptoms of leprosy. A larger proportion than in a control series showed progress in their general health, but twice as many of the leprosy patients showed worse health after the new treatment.

L. R.

COCHRANE (R. G.) RAJ (M. Paul) & ROY (E.) Treatment of Acute Lepra Reaction.—*Leprosy in India*. 1939 July Vol. 11 No 3 pp. 74-81 With 5 figs.

Tartar emetic intravenously has for long been recognized as the most effective treatment of prolonged febrile reactions in the lepromatous type of leprosy. The authors report the successful use in this complication of the more convenient intramuscular injections of up to 2 cc. doses of the less toxic pentavalent antimony preparation [so in the text, but foudamin is a trivalent antimony preparation] known as foudamin, given every other day for six doses. If it fails then

tartar emetic should be used and its failure also is an indication to look for some other cause of the fever. The most typical features of the lepra reaction are fever resisting purges and sodium bicarbonate for more than three days and exacerbation of the symptoms with the appearance of rose spot nodules in the skin. Notes and charts of illustrative cases are given. L R

INTERNATIONAL JOURNAL OF LEPROSY. Manila 1939 July-Sept.
Vol. 7 No 3 pp 403-410—Surgical Removal of Solitary Leproids.
[Correspondence]

In view of occasional reports of the successful removal of solitary lesions of nerve leprosy in particular correspondence was invited on the subject as a result of which 19 cases are tabulated with the following results. No relapse in 12. Anaesthesia of scar only in two. New lesions appeared elsewhere in two and three were not re-examined. It is pointed out that such slight lesions often yield readily to medical treatment. L R.

DHARMENDRA & CHATTERJI (S N) Total Excision of Early Neuro-Macular Lesions.—*Leprosy in India* 1939 Oct. Vol. 11 No 4 pp 117-123

Of 22 cases 18 have been followed up after the excision of a single and in one case two early neural lesions of leprosy. In three there was local and in one general relapse. Of the 14 cases not relapsing nine have only been under observation for from 1 to 7 months and five for from 14 to 32 months so it is too early to allow of definite conclusions but the plan appears to be worthy of further trial. L R

JOHANSEN (Frederick A.) Fever Therapy in Leprosy—*Internat J Leprosy* Manila. 1939 July-Sept Vol 7 No 3 pp 365-375

This paper reports on 18 leprosy patients treated with a total of 164 fever treatments, induced by means of the Kettinger hypertherm with maintenance of the patients' temperature as a rule to 105 F to 106°F for five hours. In 15 of the 164 treatments complications necessitated its termination before the full time. In five cases after eight treatments a rest of seven weeks was given before a second series of six treatments and after a further rest of six months six more treatments were given to four of the patients so the trial was a thorough one. Another patient received two courses and the rest only one course of six treatments. The main complications observed were weak and rapid pulse in 12 and in one each extreme exhaustion excruciating pain in the lower back and convulsions respectively. Shock, temporary acute nephritis tetany restlessness and delirium were also observed. In 66 per cent hyaline and granular casts and in most of them also albumin were present for a time. A temporary loss of an average of 4.4 pounds in weight was recorded. The results were very unsatisfactory for of the 15 patients 13 were worse after the treatment, 2 remained stationary 1 has been discharged on parole 1 died of pneumonia and 1 of cancer. The authors conclude that the progress of the cases continued uninterrupted by the treatment. L R

BEKVAL LONDOÑO (Alario) Review of Reansterina's Cases. [Correspondence.]—*Internat J. Leprosy* Manila. 1939 July-Sept. Vol. 7 No 3. pp 410-412.

LLERAS RESTREPO (Elvira) Preventorios infantiles. [Leprosy Prevention for Infants.]—*Rev Colombiana de Leprologia* Bogotá. 1939 Oct Vol 1 No 3 pp. 149-150

This brief article pleads for the establishment of preventoria in adequate number for the healthy children of lepers. The author states, whether as an estimate or a more accurate figure is not mentioned, that there are 2,000 healthy children in the leprosaria of Colombia. In October last year construction of a "preventorium" in the environs of Bogotá was begun it is to maintain 150 children in three age-groups (1) Those under 7 years who will be educated on a kindergarten system (2) Those between 7 and 14 years, who will be instructed on primary school lines and (3) Those from 14 to 18 years who will be trained for industrial or office work. If the 2,000 are to be dealt with many such institutions will be needed and the progress of this first, experimental, one will be watched with interest. H H S

LEISHMANIASIS

PAPERS OF ABSTRACTS IN THIS SECTION

Visceral leishmaniasis—SPEZIALE and BERGER (p. 345) report kala azar from Eritrea.

ALEXSEJEV and KOVAKOV (p. 345) find no evidence of multiplication of leishmania, other than by binary fission after the destruction of the macrophages which have engulfed them. He regards *L. donovani*, *L. infantum* and *L. tropica* as good species on epidemiological, but not on morphological grounds.

JOYEUX and SAUTET (p. 346) show that the dog louse *Linognathus setosus* is able to feed on man and that leishmania and flagellated forms are found in the intestine of these lice taken from dogs suffering from kala azar. The lice may possibly therefore act as vectors to man. YUAN *et al* (p. 346) found that infection in children in N China probably takes place chiefly between the middle of May and the middle of July. RISTORCELLI (p. 347) discusses *P. parroti*.

BOTZARIS (p. 347) has investigated the blood changes in infantile kala azar. GATTO (p. 347) shows that the Sanarelli-Shwartzman phenomenon may be produced in animals by using a filtrate of a culture of *L. donovani* for the intradermal and intravenous injections, and considers that this reaction may form the basis of the haemorrhages at times observed in visceral leishmaniasis. MURANO and VECCHIO (p. 348) show that the production of bacterial antibodies in animals with blocked reticulo-endothelial system, or in children with leishmaniasis, is increased over the normal, and attribute this to the hyperplasia of the histioid cells in these conditions, but DHAR (p. 348) refers to the seriousness of pneumonia in patients also suffering from kala azar and suggests as a reason the loading of the reticulo-endothelial system with parasites.

MATTEI *et al*. (p. 349) report kala azar in two adults in Corsica, an unusual finding though the infantile form is fairly common.

diagnosis was made by serological tests and sternal puncture. The authors consider that the dog is a reservoir and that the dog tick is the vector.

NAPIER (p 349) states that spleen puncture gives the greatest proportion of positive results and discusses the serological tests. REDDY and SUBRAMANIAM (p 349) prefer spleen puncture to sternal puncture in diagnosis though the latter is safer.

ROGERS (p 350) traces the development of the antimony treatment of kala azar and states that treatment of all cases in villages in India is followed in a few years by disappearance of the disease. Neostibosan however is expensive but with a cheap drug and sufficient staff kala azar could be greatly reduced in India. VECCHIO (p 350) found a transient phase of blood deterioration soon after the commencement of tartar emetic treatment in the kala azar of children which soon passed off.

Muco-cutaneous leishmaniasis—RAMES (p 351) reports oriental sore from the Southern Oranais district of Algeria, and GUIGNOV (p 351) a case from the Algerian littoral.

DUBOVSKOJ (p 351) describes the growth of *L. tropica* on Bilchus milk medium. SENKJI (p 351) refers to the standardization of suspensions of leishmania by means of standard opacity tubes and details the biochemical reactions of *L. tropica*.

In the Abruzzi, VANNI (p 352) found one *P. macedonicus* of 1 600 wild sandflies to be infected, using the method of serial sections in a building the inhabitants of which showed oriental sore. Infection was also present in a group of 200 other sandflies ground up and injected into rats.

VILLELA (p 352) describes mucosal leishmaniasis in São Paulo pointing out that nasal lesions may be the first to develop. Sandflies are not known to be capable of feeding inside the nose and it is possible that these nasal lesions may in fact be secondary to undetected skin infections. VILLELA *et al* (p 353) found leishmania in scrapings from the apparently normal nasal mucosa of persons with cutaneous leishmaniasis in Brazil. Treatment of patients with cutaneous lesions only should therefore not be confined to arsphenamine but should include intravenous antimonials which can destroy parasites in the nasal mucosa.

C IV

SPEZIALE (Vittorio) & BERGER (Renato) *Leishmaniosi viscerale in adulto proveniente dall'Eritrea. [Kala Azar in an Adult from Eritrea.]—Ann di Med. Nav e Colon* 1939 July-Aug Vol. 45 No 7-8. pp 332-338. With 3 figs.

The case recorded is that of a young man 25 years of age who contracted kala azar in the endemic focus in Eritrea.

C M Wemyss

ALEKSEJEV (A. G) [=ALEXEBIEFF] & KONAKHOV (A. G) *Sur la morphologie et le cycle évolutif de la Leishmania infantum [Morphology and Life-Cycle of L. infantum]—Med Parasit & Parasitic, Dis* Moscow 1939 Vol. 8. No. 3 [In Russian pp 331-338. With 2 figs.]

This paper contains observations on some points of the cytology and development of leishmania in the human host. Reference is

made to the presence in the cytoplasm of certain individuals (4 to 8 per cent.) of an azurophilic granule regarded as a metachromatic granule (=volutin) and said to be a constant inclusion since in the course of binary division of the parasite it likewise undergoes fission.

The authors further discuss the question regarding schizogony in leishmania—a notion which has recently come to the fore again—and conclude on the basis of their own observations, that there is no evidence of any other form of multiplication than binary fission. They could discover no signs of division in the leishmania enclosed in macrophages, but found indications that many of the parasites were undergoing phagocytosis. In view of this they believe that the macrophages do not constitute a favourable medium for the development of the parasite which multiplies only after the host-cell is destroyed. Though admitting the morphological identity of *L. donovani*, *L. infantum* and *L. tropica* the authors regard them as "good species" on epidemiological grounds. [This argument, however is not in accordance with the principles of zoological classification] C. A. Hoare

JOUVEL (Ch.) & SARTET (J.) Le pou du chien *Linognathus setosus* (Olfier 1816) peut éventuellement piquer l'homme. Rôle vecteur éventuel de cet insecte. [Ability of the Dog Louse to Bite Man: its Possible Role as Vector].—*Arch. Méd. Gén. et Colon.* 1939 Vol. 8. No. 3. pp 73-76

Having shown that the dog louse (*Linognathus setosus*) taken off dogs suffering from kala azar and harbouring leishmania in the skin is liable to bite leishmania and the flagellate forms of these in the intestine the author raises the question of the possibility of this insect being a vector of the disease. The present paper records experiments to test the capacity of the dog louse to bite human beings. It was found that it was able to do so that its bite was attended by little or no irritation during or after it was inflicted and that it sucked blood slowly during as long as one hour. It therefore seems possible that the dog louse either by its bite, dejecta or body fluids when crushed might, under certain conditions, be able to bring about the transmission of kala azar. C. M. Wenyon.

YAL (H. C.) CHU (F. T.) & LEE (C. U.) The Seasonal Incidence of Kala-Azar in Infants and its Significance in Relation to the Transmission Problem of the Disease.—*Chinese Med. J.* 1939 Sept. Vol. 56 No. 3. pp 241-264 With 1 graph. [12 refs.]

Data regarding 36 children under one year of age who were diagnosed as suffering from kala azar in N. China were carefully analysed with a view to determining the time when infection must have occurred. It appears that with the exception of one case infection took place in the early summer months, probably between the middle of May and the middle of July. This corresponds with the period of greatest incidence of *Phlebotomus chinensis*, specimens of which were found naturally infected during June and July in kala azar houses. One child, born in September was 5.5 months old when the disease was diagnosed but it can be assumed that infection occurred soon after birth at the end of the sandy season. The results obtained do not lend support to any theory of transmission which does not take into account a period of greatest infectivity. The paper contains a number

of tables and charts giving the data on which the conclusions are based and abstracts of the case histories of the children involved.

C M IV

COLAS-BELCOUR (J) & ROMAÑA (C.) Présence de *Phlebotomus perniciosus* en Seine-et-Marne [*P. perniciosus* in Seine-et-Marne]—*Bull Soc Path Exot* 1939 Dec. 13 Vol. 32. No 10 p 901

RISTORCELLI (A.) Sur les phlébotomes de l'île de Crète. [Sandflies of the Isle of Crete]—*Ann Parasit Humaine et Comparée* 1939 July 1 Vol 17 No 4 pp 355-358 With 1 fig

The author reports a collection of 138 sandflies from Canea Crete. Of the eight species known to occur in this locality four were represented in the collection. Having had the occasion to examine a specimen of the supposed *Phlebotomus parroti* var *italicus* taken in Herakleion the author concludes that the characters of *P. parroti* itself are so variable that there is no need to recognize the sub-species *italicus*.

C M IV

PARROT (L.) & MARTIN (R.) Notes sur les phlébotomes, XXX.—Une variété nouvelle de *Phlebotomus sergenti* d'Éthiopie [A New Variety of *P. sergenti* in Ethiopia.]—*Arch Inst. Pasteur d'Algérie* 1939 Sept. Vol. 17 No 3 pp 484-489 With 6 figs. [10 refs.]

MARTIN (Raymond) Observations sur les Phlébotomes d'Éthiopie. (Deuxième mémoire.) [The Phlebotomus of Ethiopia.]—*Arch Inst Pasteur d'Algérie* 1939 Sept. Vol. 17 No 3 pp 490-501

BOTZARIS (A.) Beitrag zur Hämatocytologie der Leishmaniasis infantum in Griechenland bei 30 Fällen. (Mit einigen Angaben der Symptomatologie.) [Haematocytology of 30 Cases of Infantile Kala Azar in Greece, with Some Notes on Symptomatology]—*Folia Haematologica* 1939 Vol. 62 No 2/3 pp 215-224 [31 refs.]

The author has studied in Greece a series of 30 cases of infantile kala azar from the point of view of the changes which are to be observed in the blood. He has noted the usual anaemia and leukopenia with lymphocytosis and has set out in tabular form the various cells observed and their percentages. Certain observations were also made on the character of the fever and other symptoms. Those interested in the blood changes in this disease will find in the paper much detailed information.

C M IV

GATTO (Ignazio) Ricerche e considerazioni sul fenomeno di Sanarelli Shwartzman provocato con la *Leishmania donovani* [The Sanarelli-Shwartzman Phenomenon provoked with *L. donovani*]—*Giorn di Batteriol e Immunol* 1939 Sept. Vol. 23 No 3 pp 418-429 [29 refs.] English summary (9 lines)

In 1914 SANARELLI showed that the intravenous injection of small quantities of the filtrate of a broth culture of *Bacterium coli* and *Proteus vulgaris* into rabbits which 24 hours before had received intravenously a non fatal dose of cholera vibrios was followed frequently

by a violent crisis characterized by vaso-dilatation of the abdominal vessels and death. In 1928 SHWARTZMAN observed that if an intra-venous injection of a bacterial filtrate was given to a rabbit 20-48 hours after a small quantity of the same filtrate had been injected into the skin there might develop an haemorrhagic response followed by necrosis at the site of the skin inoculation. The two phenomena are regarded as identical, the reaction being termed the Sanarelli Shwartzmann, or simply the S S phenomenon. In the present paper the author shows that the reaction may occur when an injection of a filtrate of a culture of *Leishmania donovani* or an autolysate of the flagellates into the skin is followed later by an intravenous injection of a filtrate of *Bact. coli* or of the filtrate or autolysate used for the skin injection. It is thought that this reaction affords an explanation of the haemorrhages which are at times observed in cases of visceral leishmaniasis.

C M IV

MURAYO (Giulio) & VIZZOSO (Federico). Sul interessamento del sistema reticolo-istocitario nella leishmaniosi interna. 2. La produzione degli anticorpi agglutinanti nella leishmaniosi interna. [Relation of the Reticulo-Endothelial System to Kala Azar 2. Production of Agglutinating Antibodies in Kala Azar]—*Parassiti* 1939 Oct. Vol. 47 No 10 pp. 861-877 [31 refs.]

The authors discuss the views which have been expressed regarding the part played by the reticulo-endothelial system in the production of antibodies. As there appeared to be no agreement about this they carried out a series of experiments designed to throw light on the problem. The serological response of normal rabbits to the injection of bacterial vaccines (typhoid and para-typhoid) was compared with that of rabbits in which the reticulo-endothelial system had been blocked. In all cases there was a better production of antibodies in the animals with a blocked reticulo-endothelial system. These observations were extended to children suffering from kala azar in which it can be presumed that an hypertrophied reticulo-endothelial system is blocked with leishmania. Here again there was a superior response to that which was observed in normal children. These results, according to the authors, support the view that immune bodies are products of the cells of the reticulo-endothelial system and that they are increased in leishmaniasis because of the "hypertrophy and hyperplasia of the histioid cells of that system." [See also this *Bulletin* 1939 Vol. 36 p. 1029.]

C M IV

DEAR (D R). Bearing of Enlarged Spleen, mostly of Kala-Azar on Pneumonias.—*Trans. Med. College Ra-Union Calcutta*. 1939-39 Vol. 2 pp. 62-64

In a fairly large experience of pneumonia the author has found that the occurrence of this disease in subjects already suffering from enlargement of the spleen and liver chiefly as a result of kala azar is much more serious than when it attacks a healthy person. In the case of kala azar at least the author concludes that the protective mechanism of the host is hindered by the loading of the reticulo-endothelial cells with parasites. Even if such cases recover from one attack they are very liable to another. On the other hand recovery may be followed by retrogression of the primary disease. In all such cases it is important to treat the underlying condition.

C M IV

MATTEI (Charles) GIRAUD (Paul) DUMON (G.) & DUMON LENÈGRE
Mme Un nouveau cas de leishmaniose viscérale de l'adulte
d'origine corse [A Fresh Case of Kala Azar in the Adult from
Corsica.]—*Bull et Mém Soc Méd Hôpit de Paris* 1939
Dec 1 55th Year 3rd Ser No. 26 pp 1299-1304

The case reported is that of a woman 27 years of age who living in Corsica contracted a disease characterized by splenomegaly anaemia and continuous fever. The diagnosis was obscured by the report of a discovery of malarial parasites in the blood. A failure to respond to quinine treatment led to a further investigation of the case. Kala azar being suspected, serological tests were carried out. These being positive a sternal puncture was performed with the result that numerous leishmania were found. A cure was effected by means of neostibosan. Though kala azar is fairly common in children in Corsica it is so rarely encountered in adults that a diagnosis in the case reported was not made for some time. The occurrence of a second case at the time of presentation of this paper suggests to the authors that adults in Corsica may be infected more commonly than is at present suspected. The village from which the first patient came was known to be an endemic focus of infantile and canine kala azar. The dog belonging to the patient suffered from a cutaneous condition which the doctor had diagnosed as due to leishmaniasis while the patient herself stated that she had been bitten by a tick. The authors maintain that these facts support their contention that the dog is a reservoir and the tick the vector of the disease. C M II

NAPIER (L. Everard) The Diagnosis of Kala-Azar in Dispensary Practice.—*Indian Med Gaz* 1939 Oct Vol. 74 No 10 pp 600-602. With 2 plates (1 coloured)

This article comprises a series of notes indicating the procedures to be adopted for the laboratory diagnosis of kala azar in dispensary practice. It is illustrated by two plates showing the negative and positive aldehyde and antimony tests for the disease. The various procedures for the discovery of parasites—blood film examination spleen and sternal punctures—are reviewed and it is shown that spleen puncture gives the greatest percentage of positive results. Culture methods are only possible when a well equipped laboratory is available. Of the two serological tests the antimony test will often give a positive result at an earlier date than the aldehyde test but when the spleen is markedly enlarged a positive diagnosis cannot be made with safety on the result of the antimony test. In such cases the aldehyde test should be carried out. When these tests both give a doubtful result attempts should be made to discover the parasites. If none is found then the case is regarded as pending a further serological test being made in a month's time. If there has been no advance in the direction of a definite positive result the case is probably not one of kala azar.

C M IV

REDDY (D Govinda) & SUBRAMANIAM (R.) Sternal Puncture in Kala-Azar.—*Indian Med Gaz* 1939 Nov Vol. 74 No 11 pp 664-665

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(122)

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MATTEI (Charles) GIRAUD (Paul) DUMON (G.) & DUMON LENÈGRE Mme. Un nouveau cas de leishmaniose viscérale de l'adulte d'origine corse [A Fresh Case of Kala Azar in the Adult from Corsica].—*Bull et Mém Soc Méd Hôpit de Paris* 1939 Dec 1 55th Year 3rd Ser No 26 pp 1299-1304

The case reported is that of a woman 27 years of age who living in Corsica contracted a disease characterized by splenomegaly anaemia and continuous fever. The diagnosis was obscured by the report of a discovery of malarial parasites in the blood. A failure to respond to quinine treatment led to a further investigation of the case. Kala azar being suspected serological tests were carried out. These being positive a sternal puncture was performed, with the result that numerous leishmania were found. A cure was effected by means of neostibosan. Though kala azar is fairly common in children in Corsica it is so rarely encountered in adults that a diagnosis in the case reported was not made for some time. The occurrence of a second case at the time of presentation of this paper suggests to the authors that adults in Corsica may be infected more commonly than is at present suspected. The village from which the first patient came was known to be an endemic focus of infantile and canine kala azar. The dog belonging to the patient suffered from a cutaneous condition which the doctor had diagnosed as due to leishmaniasis while the patient herself stated that she had been bitten by a tick. The authors maintain that these facts support their contention that the dog is a reservoir and the tick the vector of the disease. C M H

NAPIER (L. Everard) The Diagnosis of Kala-Azar in Dispensary Practice.—*Indian Med Gaz* 1939 Oct Vol. 74 No 10 pp 600-602 With 2 plates (1 coloured)

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REDDY (D Govinda) & SUBRAMANIAN (R.) Sternal Puncture in Kala-Azar.—*Indian Med Gaz* 1939 Nov Vol. 74 No 11 pp 664-665

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by a violent crisis characterized by vaso-dilatation of the abdominal vessels and death. In 1928 SHWARTZMAN observed that if an intra venous injection of a bacterial filtrate was given to a rabbit 20-48 hours after a small quantity of the same filtrate had been injected into the skin there might develop an haemorrhagic response followed by necrosis at the site of the skin inoculation. The two phenomena are regarded as identical, the reaction being termed the Sanarelli-Schwartzmann, or simply the S.S. phenomenon. In the present paper the author shows that the reaction may occur when an injection of a filtrate of a culture of *Leishmania donovani* or an autolysate of the flagellates into the skin is followed later by an intravenous injection of a filtrate of *Bact. coli* or of the filtrate or autolysate used for the skin injection. It is thought that this reaction affords an explanation of the haemorrhages which are at times observed in cases of visceral leishmaniasis.

C. M. H.

MURAO (Grubo) & VECCHIO (Federico). Sull'interessamento del sistema reticolo-estocitario nella leishmaniosi interna. 2. La produzione degli anticorpi agglutinanti nella leishmaniosi interna. [Relation of the Reticulo-Endothelial System to Kala Azar 2. Production of Agglutinating Antibodies in Kala Azar]—*Pediatrics* 1939 Oct. Vol. 47 No. 10. pp. 861-877 [31 refs.]

The authors discuss the views which have been expressed regarding the part played by the reticulo-endothelial system in the production of antibodies. As there appeared to be no agreement about this they carried out a series of experiments designed to throw light on the problem. The serological response of normal rabbits to the injection of bacterial vaccines (typhoid and para-typhoid) was compared with that of rabbits in which the reticulo-endothelial system had been blocked. In all cases there was a better production of antibodies in the animals with a blocked reticulo-endothelial system. These observations were extended to children suffering from kala azar in which it can be presumed that an hypertrophied reticulo-endothelial system is blocked with leishmania. Here again there was a superior response to that which was observed in normal children. These results, according to the authors support the view that immune bodies are products of the cells of the reticulo-endothelial system and that they are increased in leishmaniasis because of the "hypertrophy and hyperplasia of the histioid cells of that system." [See also this *Bulletin* 1939 Vol. 36 p. 1029]

C. M. H.

DHAR (D. R.) Bearing of Enlarged Spleen, mostly of Kala Azar on Pneumonias.—*Trans. Med. College Re-Union. Calcutta.* 1938-39 Vol. 2. pp. 62-64

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It is reported that in two cases of kala azar diagnosed by spleen puncture sternal puncture had failed to reveal leishmania. Sternal
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puncture is said to be time consuming and tedious though it requires less preparation and after-care than spleen puncture and, moreover is safer. It is clear that a negative sternal puncture does not exclude a diagnosis of kala azar. C M W

ROGERS (Leonard) The Antimony Treatment of Kala-Azar—*Nature* 1939 Dec. 16 Vol. 144 No 3659 pp 1003-1004

In this note the author traces the history of the discovery of the cause of kala azar and its treatment. The tartar emetic remedy introduced with such good results by CHRISTINA and CAROIA in Sicily and by the author in India was replaced by the pentavalent compound ureastibamine originated by BRAMACHARI. Although this substance was less toxic than tartar emetic it was of uncertain composition and varied in its antimony content. Then a series of more definite compounds was introduced in Germany culminating in neostibosan for intravenous and solustibosan for intramuscular injection. With these a cure rate of over 90 per cent. can be expected.

It has been shown by NAPIER that the treatment of all cases in Bengal villages with neostibosan has been followed in a few years by the disappearance of the disease. A similar result was obtained by the treatment by the Assam Government, chiefly with ureastibamine of over 300,000 cases between 1923 and 1933. Unfortunately the cost of treatment for the poor villagers in India is prohibitive. NAPIER, in 1925 finding that the price of sufficient drug for a single case was about £3. It is evident, the author states, that with a cheap drug and sufficient medical staff kala azar in India would be reduced to small proportions. C M W

SAXENA (G. S.) Some Interesting Facts about a Case of Kala Azar—*Indian Med Assoc* 1939 May Vol. 8, No. 8, pp 480-481

The report of a case in Patna presumed to be kala azar on clinical grounds alone and after a failure to respond to quinine and atabrin therapy. A cure followed the administration of neostibosan and stiburamin (B.C.P.W.) C M W

VACCINO (Federico) Indici ematologici del meccanismo di azione del tartaro stibato nella cura della leishmaniosi interna. [Haematological Signs of the Mechanism of the Action of Tartar Emetic in the Treatment of Kala Azar]—*Pediatrics*, 1939 Dec Vol. 47 No. 12, pp 1028-1039 [27 refs.]

The paper describes the results of an investigation into the changes which took place in the blood during the treatment with tartar emetic of six cases of kala azar in children from 9 months to 6 years of age. It was found that as a rule there was a transient negative phase during which the blood condition deteriorated, soon after the commencement of treatment. This was shown by increase in the lymphocytes and a decrease in the number of neutrophilic leucocytes and red blood corpuscles. At the same time the bilirubinaemia became more marked, while the reticulocyte count was greater. These changes which quickly passed off, are attributed by the author to a temporary exaggeration of the condition of hypertrophy of the reticulo-endothelial system. It was noted that when the leishmanial infection was not a heavy one the negative phase might not be apparent. C M W

RAMES (C.) Sur l'existence du bouton d'Orient à Beni Abbès (Sahara Oranais) [Existence of Oriental Sore at Beni Abbès]—*Arch Inst Pasteur d'Algérie* 1939 Sept Vol 17 No 3 pp 482-483. With 1 plate.

The detection of a case of oriental sore in a native boy 4 years of age at Beni Abbès extends the area in which the disease occurs in the Southern Oranais district of Algeria C M IV

GUGON (G.) Nouveau cas de bouton d'Orient sur le littoral algérien. [Fresh Case of Oriental Sore on the Algerian Littoral.]—*Arch Inst Pasteur d'Algérie* 1939 Sept Vol 17 No 3 p 481 With 1 plate.

The case reported is that of a woman aged 28 who contracted oriental sore on the right cheek. She had always lived in the Philippeville district her home being at Place Jeanne d'Arc. C M IV

DUBOVSKOJ (P. A.) Le milieu lacté pour la culture des leishmanies [Milk Culture Medium for Leishmania.]—*Médecine Parasit & Parasitic Dis* Moscow 1939 Vol 8 No 3 [In Russian pp 339-340 French summary p 340]

Cultures of *L. tropica* isolated directly from human sores were grown successfully in a medium devised by Bianchi and made up as follows. Cow's milk is first freed of fat by passing it through the separator and filtering through linen, after which it is distributed into sterile test-tubes (6-8 cc. in each) and sterilized in a Koch sterilizer for 20 minutes daily three days in succession. To each tube is then added 0.75-1 cc defibrinated rabbit blood. The cultures—incubated at 20-22°C.—show abundant growth by the fifth or sixth day and can be kept without subinoculation for over 2 months. C A Hoare.

- i SENEKJI (H. A.) Standardization of *Leishmania tropica* Suspension with Brown's Standard Opacity Tubes.—*Amer J Trop Med* 1939 Nov Vol 19 No. 6, pp. 599-600
- ii ——— Biochemical Reactions of *Leishmania tropica*—*Ibid* pp. 601-604

i In the first of these papers the author describes the standardization of saline suspensions of culture forms of leishmania from the surface of solid media by means of Brown's opacity tubes (Burroughs Wellcome & Co.) He has established that tubes No 1 to No 10 represent concentrations of twenty and a half million organisms per cc up to one hundred and twenty-one million per cc.

ii In the second paper the biochemical culture reactions of *Leishmania tropica* are noted. These are —

- 1 No production of acid or gas from carbohydrates
- 2 No liquefaction of gelatin
- 3 Methyl red reaction negative
- 4 Voges Proskauer reaction negative

- 5 Peptonization of milk
- 6 Bile soluble
- 7 No production of indole

The various media employed for these tests are enumerated.

C M IV

VANONI (Vittorio) Osservazioni e ricerche sperimentali in una endemia di leishmaniosi cutanea. [Researches on an Endemic of Oriental Sore].—*R. Accad. d'Italia. Mem. d. Classe di Sci. Fisiche Mat e Nat.* 1939 Vol. 10 Extract No 3. pp. 87-104 With 3 text figs. & 22 figs. on 12 plates. [12 refs.]

The paper is an amplification of one previously published by the author [this *Bulletin* 1939 Vol. 36 p. 1034]. He describes in detail the type of infection and the character of the leptomastix flagellates found by him in one of 200 specimens of wild *Phlebotomus macdonnensis* captured by him in Roseto in a building the upper part of which was occupied by a family some of the children of which had actual oriental sores on the face while others had the scars of healed sores. It seemed clear that the flagellates were developmental forms of leishmania. In all, 1 800 wild sandflies were examined by the method of serial section but the example mentioned above was the only instance of a natural infection. Two hundred other specimens collected in the same building were ground up in saline solution and the resulting emulsion inoculated into the root of the tail of three rats. After 40 days one of the rats showed a red swelling at the site of inoculation and in it leishmania were found, proving that at least one of the 200 sandflies was naturally infected. It seems clear to the author that this sandfly is the vector of oriental sore in the Abruzzi district of Italy. By inoculation of parasites from an oriental sore into the skin of a hamster (*Cricetus cricetus*) a lesion containing leishmania was produced. C M IV

VILLELA (Francisco) Dados estatísticos sobre a leishmaniose das mucosas em Aracatuba, S. Paulo [Statistical Data on Mucosal Leishmaniasis in Aracatuba, S. Paulo].—*Folia Med.* 1939 May 25 Vol. 20 No 16. pp. 243-244

During the 22 years preceding the end of 1935 there were seen at a clinic in São Paulo 1 791 cases of mucosal leishmaniasis. The disease was about nine times as common in men as in women and chiefly in individuals over 16 years of age. Of a series of 187 cases the infection was limited to the nasal mucosa in 146. The other cases had lesions of the buccal, pharyngeal, laryngeal or other mucosal surfaces of the mouth. In many of these cases evidence was obtained of previous cutaneous lesions but this was not always possible as the nasal infection may manifest itself some years after the skin lesions have healed. In five of the cases in which cutaneous sores were present as well as the nasal lesions the patients declared that the nasal condition was the first to develop. If the nasal infection was actually the primary one it would have to be assumed that the sandfly was capable of feeding inside the nose a habit which has so far never been recorded. On the other hand it might be that there was some latent undetected skin infection and that parasites had been conveyed to the nasal mucosa by way of the blood or lymph. Such a latent skin infection might only

become apparent as a lesion after the nasal condition had developed. Where a definite cutaneous sore exists parasites might readily be inoculated mechanically on to the nasal mucosa. C M W

VILLELA (F) PESTANA (Bruno R.) & PESSOA (S B) Presença da *Leishmania brasiliensis* na mucosa nasal sem lesão aparente em casos recentes de leishmaniose cutânea. [Presence of *L. brasiliensis* in the Nasal Mucosa without Apparent Lesions, in Recent Cases of Cutaneous Leishmaniasis.]—*Hospital* Rio de Janeiro 1939 Dec. Vol 16 No 6 pp 953-960 With 1 fig

Twelve cases of cutaneous leishmaniasis in Brazil which exhibited no evident lesions of the nasal mucosa were carefully studied from the point of view of initial lesions in the nose. In five cases small initial lesions were detected in the nose but in only one of them were leishmania found. In the remaining seven cases the nasal mucosa appeared normal but nevertheless scrapings from the mucosa were made and in films of the exuding blood leishmania were found in four. The parasites were in some of the cases quite numerous. It seems clear that this deposit of parasites in the nasal mucosa would lead in many cases to the characteristic muco-cutaneous disease. Moreover the nasal lesions in certain cases appear after the cutaneous condition has been subject to treatment with eparsono (arsphenamine solution ready for injection) which does not eradicate the nasal infection. On this account treatment of cases which show only cutaneous lesions should be the administration of eparsono combined with intravenous antimonials which are capable of destroying parasites in the nasal mucosa. C M W

MALARIA.

PRECIS OF ABSTRACTS IN THIS SECTION

MARNEFFE *et al* (p 355) show that in the Tonking delta malaria is relatively mild but subject to seasonal epidemic outbursts during which *P. falciparum* is found as often as the otherwise more common *P. vivax*. *A. hyrcanus* var. *sincensis* is very prevalent and is the principal vector here being anthropophilic.

FAUST (p 356) shows that malaria is spreading to the west from the two previously existing zones of the southern United States. GIGLIOLI (p 356) incriminates *A. darlingi* as the only important vector in British Guiana. In plantations with low medium or high spleen rates the ratio of births to deaths progressively diminishes and the infant mortality progressively increases. KUHN and RUIZ (p 357) describe the endemic malaria of Costa Rica most prevalent in the low lying coastland. *A. albimanus* appears to be the only vector.

PICCALUGA (p 358) has investigated the gametocyte rates of the inhabitants of a town in Sardinia.

In uninfected Italians coming to an endemic area in Abyssinia CORRADETTI (p 358) observes that at first *P. falciparum* infection is the most frequent but that the incidence of *P. vivax* infection increases as time goes on. He (p 358) gives an account of the anophelines of the Uollo Jeggiu region of Italian East Africa.

RUSSELL and MOHAN (p. 359) have investigated the effects of different larval environments on the growth of *A. stephensi* and its susceptibility to infection with *P. falciparum*. They (p. 359) find the type form and the *myxozensis* variety of *A. stephensi* to be easily infected with *P. falciparum*.

STONE and REYNOLDS (p. 360) consider that eggs of *A. albopictus* and other anophelines in Panama may hibernate through the dry season in earth moistened by seepage and protected against subsequent drying by leaves or grass. VARGAS (p. 360) discusses anophelism without malaria in Mexico.

VAYONIS (p. 360) shows that in *P. vivax* infection reticulocytes are infected much more frequently than mature erythrocytes and attributes this to the relative stickiness of the reticulocytes. In the early stages of the infection there is a transient increase in the number of reticulocytes with each attack of fever. GREIG and NEIL (p. 361) found that in malaria the administration of quinine or plasmoquine is followed by an increase in the number of reticulocytes. This does not occur in normal persons and it appears that in malaria quinine produces haemolysis followed by erythropoiesis, and this finding supports the view that quinine may provoke blackwater fever. At the same time there is a fall in haemoglobin, and an increase in the blood sedimentation rate occurs in the course of the infection, returning gradually to normal after the administration of specific drugs.

LESAR *et al* (p. 362) report *P. malariae* infection transmitted by blood transfusion from a man who had been away from malarious countries for 13 years. A similar case is reported by NABARRO and EDWARD (p. 362) the donor had left Ceylon 12 years previously and lived in England. The conclusion is that persons who have had malaria or who have lived in malarious countries are not suitable as blood donors especially to children.

GOVÁLEZ BARRERAS (p. 362) reports favourably on prontosil in treatment. LOONG and McLENDON (p. 362) show that neither mapharsen nor trypanamide eliminate *P. malariae* from the blood although they relieve symptoms.

CASATI (p. 363) found no benefit from intravenous adrenalin treatment in a series of cases of malarial splenomegaly compared with a group of controls in Sardinia, either in the number of attacks, the size of the spleens or the improvement of the blood or general condition. MAROTTA (p. 363) similarly states his opinion that adrenalin has no action in malaria. It does not shorten the disease or prevent relapses, nor does it reinforce the action of quinine or improve the general condition. PIZILLO (p. 364) on the other hand, a convinced believer in the Ascoli treatment, reports success in the treatment of nervous syndromes in malaria by this method.

AHMED (p. 364) describes the good results obtained by anti-malarial measures in a railway settlement. O'NEILL (p. 364) gives particulars of the construction of concrete lined ditches for mosquito control. KUBO and OHITO (p. 365) describe a new larvicide oil. SYDDIQ (p. 365) describes the method of applying Paris green by using mud balls containing 2 per cent. of the powder. These are added to water not more than 5 feet deep and the Paris green is liberated.

SCHILLING (p. 366) states that it is possible to inject about 100 schizonts or sporozoites of *P. vivax* in man without producing infection, and that therefore man has a fundamental resistance to malaria not based on premunition. Increased resistance can be obtained by

repeated small inoculations but resistance to schizonts does not protect against sporozoites and if sporozoites are injected the immunizing results are very small. The receptivity of the individual is an important factor. Experimental results are quoted and the object of the work is to explore the possibility of protective vaccination.

Malaria of Birds and Monkeys—GIOVANNOLA (p 367) has given an account of the bird malaria parasites suggesting that the Plasmodiidae and the Haemoproteidae should be regarded as one family a suggestion criticized by WENYON in comment.

LION (p 367) found no reciprocal effect of simultaneous infection of fowls with *P. gallinaceum* and *Spirochaeta gallinarum*.

RODRIGUES (p 367) quotes experiments which indicate that *P. schuetti* (which resembles *P. vivax*) is a true parasite of the chimpanzee and is not inoculable to man whereas *P. vivax* gives rise only to an unapparent infection in the chimpanzee.

EATON and COGGESHALL (p 368) show that complement fixing antibodies but not protective antibodies are produced in monkeys by the injection of killed *P. knowlesi* though the latter are provoked by living *P. knowlesi*. The parasitocidal property of serum after infection appears to be due to an anti-erythrocyte substance.

C IV

ACCINELLI FERNANDEZ (Nemesio) El paludismo como enfermedad profesional [Malaria as an Occupational Disease.]—*Crónica Méd Lima* 1939 Mar Vol 56 No 909 pp 77-82.

— Le paludisme comme maladie professionnelle.—*Rev du Paludisme et de Méd Trop* Paris 1939 Dec. 15 Vol 1 No 6 pp 184-188.

A large number of work people of both sexes contract malaria in Peru in plantations and in other agricultural pursuits especially in the coastal valleys in which malaria is endemic. Malaria in such circumstances is an occupational hazard and the author urges the importance of including it in the list of professional diseases in the Workmen's Compensation Acts.

Norman White

MARNEFFE (H.) GASCHEN (H.) & NGUYEN BA-TUNG Contribution à l'étude du paludisme du delta Tonkinois. [Malaria in the Tonking Delta.]—*Arch Insts Pasteur d'Indochine* 1938 Apr Vol 7 No 27 pp 263-296 With 2 graphs & 1 folding plan.

The middle reaches of the Red River delta in Tonking have a reputation for relative salubrity but here and there there are places in which malaria has recently been prevalent. Unlike the malaria of the mountainous regions the disease is relatively mild, diffuse and characterized by seasonal epidemic outbursts. Such places are Haiduong a town of 7 000 inhabitants and Binh-ha a rural agglomeration of 6 000 in the midst of rice fields in the near vicinity. This report details the results of prolonged investigations that have been carried out into the epidemiology of malaria in these two places.

In Haiduong malaria outbreaks occur at the beginning of summer and in the winter the former being more severe in Binh-ha at the end of autumn. Sometimes outbreaks are severe pernicious cases

PICCALUGA (Lorenzo) Influsso dell'età e delle stagioni sulla presenza dei gametociti nel malarici. [Influence of Age and Season on the Presence of Gametocytes in Blood of Persons Infected with Malaria.]—*Riv di Malarologia*. Sez. I. 1939 Vol. 18. No. 3. pp. 168-178. With 8 graphs. English summary

In San Vito Sardinia, population 5 000 the author has investigated during a period of five years, the influence of age and season on the appearance of gametocytes in the peripheral blood. Of 1 168 positive blood films gametocytes were found in 172, 14.7 per cent. Of these gametocyte carriers 83 per cent were under 12 years of age 11 per cent. from 13 to 19 years, and 6 per cent. 20 years of age or over. Gametocytes can be found in all months of the year. Those of *P. vivax* are numerous in spring most numerous in midsummer and decline in number in the autumn. *P. falciparum* and *P. malariae* gametocytes are almost completely absent in the spring, appear in summer and are most prevalent in the autumn. N. W.

CORRADETTI (Augusto) Son fattori determinanti i tipi epidemici della terzana benigna e della estivo autunnale. [Factors determining Epidemic Types of Benign Tertian and Subtertian Malaria.]—*Riv di Malarologia* Sez. I. 1939 Vol. 18 No. 3. pp. 177-184. With 1 chart. English summary

A curve is reproduced showing the monthly incidence of cases of malaria, caused by *P. vivax* and *P. falciparum* respectively among an Italian population uninfected with malaria at the time of arrival in the hyperendemic area in which the observations were made. Malaria in the Uollo Jeggu District, the area in question, prevails in epidemic form from July to October which includes the rainy season. In most of the district November to July is the inter-epidemic period. Subtertian malaria was most in evidence but benign tertian infections were much more in evidence among the non-immune population under observation than among the immunized indigenous population. The author believes that most people in such endemic and hyperendemic areas acquire mixed infections. *P. falciparum* predominates at first. *P. vivax* remaining latent only subsequently reveals its presence. The rise of the subtertian curve depends partly on the latency of benign tertian infections. Of 75 infected persons *P. falciparum* was found in 62.7 per cent. at the first examination, *P. vivax* in 37.2 per cent. after these persons had been under observation from 5 to 10 weeks the proportion of *P. falciparum* to *P. vivax* infections was 55.6 to 44.3. A. W.

CORRADETTI (Augusto) Lanofelmia nella regione Uollo Jeggu. [Anopheles in the Region of Uollo Jeggu.]—*Riv di Parassit.* Rome. 1939 Sept. Vol. 3. No. 3. pp. 207-219. With 1 map & 3 graphs. English summary (6 lines)

The author details the results of a two-year study of anopheline prevalence in the Uollo Jeggu region of Italian East Africa. Twelve species of Anopheles are found. In the dry season, February to June at altitudes below 1,000 metres, *A. gambiae* predominates, breeding almost exclusively in perenial streams. From 1,000 to 1,800 metres the most prevalent species are *A. cinereus*, *A. constanti*, *A. demelloni*.

and *A. pretoriensis* less prevalent were *A. christyi*, *A. gambiae*, *A. pharoensis*, *A. rhodesiensis* var. *dithalissimilis*, *A. squamosus* and *A. macmahoni*. *A. dithali* was found breeding once—it is extremely rare. Above 1,800 metres the great majority of breeding places contained only *A. cinereus* larvae. In some places numerous larvae of *A. garnhami* were found.

With the advent of the heavy rains dry weather breeding places are scoured out and pools of rain water afford new breeding facilities.

During the rainy season *A. gambiae* is much more prevalent than any other species at altitudes up to 1,800 metres. The prevalence of *A. christyi* also increases during the rains especially between 1,800 and 2,000 metres like *A. gambiae* it can breed in pools of rainwater apparently deprived of vegetation.

Tables give the prevalence of each species in the different localities in each month of the year

N IV

RUSSELL (Paul F) & MOHAM (B N) Experimental Infections in *Anopheles stephensi* (Type) from Contrasting Larva Environments. —*Amer J Hyg* 1939 Sept Vol 30 No 2 Sect. C pp 73-79 [13 refs.]

This paper records an attempt to answer the question Can the power of an anopheline to transmit malaria be reduced or inhibited by modifying the character of its larval breeding place as for instance by increasing the ammoniacal or albuminoid nitrogen to a degree less than that required to prevent breeding?

A strain of *A. stephensi* which came from drinking water wells in Madras was used. Two colonies were kept going in the laboratory in identical conditions except for differing larval environments. Larvae were reared in tap-water in one case cow-dung water in the other—120 cc of fresh cow-dung to 6 litres of tap water. Adults from the cow-dung environment tended to be smaller—the average weight of a fully fed female was 0.00165 gm. as compared with 0.00197 gm from tap-water.

Mosquitoes from both colonies were given similar opportunities of becoming infected with *P. falciparum*. Females emerging from tap water were infected with sporozoites up to as high a rate as 73.5 per cent with an average sporozoite index of 37.1 in 634 dissections. Females emerging from cow-dung water were infected with sporozoites up to as high a rate as 70.8 per cent with an average sporozoite rate of 29.0 in 718 dissections. The chemical character of the water in which *A. stephensi* breeds has little or no influence on the susceptibility of adults to infection with *P. falciparum*.

N IV

RUSSELL (Paul F) & MOHAM (B N) Experimental Malaria Infections in Two Races of *A. stephensi*—*Indian Med Gaz.* 1939 Aug Vol. 74 No 8 pp 466-470

This note concerns the susceptibility to infection with *P. falciparum* of two races of *A. stephensi* the type form as found in Madras and *A. stephensi* var. *myzorensis* [SWERT & RAO see this *Bulletin* 1938 Vol. 35 pp 426-427]. Both races were easily infected experimentally and they were about equally susceptible. The percentage of sporozoite

infections in 61 of the type form was 41.0 and in 89 *myzoxenus* 36.0, mosquitoes of the two forms having been fed simultaneously on crescent carriers. \ II

STOVE (Wm. S.) & REYNOLDS (Francis H. K.) Hibernation of Anopheline Eggs in the Tropics.—*Science* 1939 Oct. 20. \ S Vol. 90 No. 2338. pp. 371-372.

Although there is a small amount of anopheline breeding throughout the dry season in Panama the authors consider it to be too slight to account for the sudden increase of larvae found 7 to 10 days after the onset of the rains. Eggs of *A. albimanus* found in December 1938 appeared to be larger than those secured during the summer and required 7 to 14 days instead of the usual 24 to 48 hours, to hatch.

There are many seepage areas in the Canal Zone which persist for a month after the beginning of the dry season, but thereafter they receive no water. Where the earth is covered by leaves and grass it contains some moisture but is still crumbly and will not pack in the hand. Superficial earth taken from these areas at the end of the dry season was covered with water and hay infusion and carefully protected. Within a few days larvae of *A. albimanus*, *A. larumaculatus* and *A. punctimaculatus* were recovered. The authors consider that the eggs were present in the earth collected and that, therefore hibernating eggs are a possible explanation of survival. C II

VARGAS (Luis) Anopheles sin malaria en México [Anopheline without Malaria in Mexico].—*Medicina Mexico*, 1939 Aug 25 Vol. 19 No. 346. pp. 334-339 [21 refs.] English summary (7 lines)

In the county of Ocoyoacac District of Lerma, Mexico there is a locality in which anopheline prevalence is high but there is no endemic malaria. The only anopheline found belongs to the *A. maculipennis* group and has been called *A. maculipennis* var. *sticticus*. The author describes its morphology, reviews the literature and concludes that it should be called *A. sticticus* (Hoff 1935) Vargas 1939

A II

VARONIS (George) Observations on the Parasitization of Erythrocytes by *Plasmodium vivax* with Special Reference to Reticulocytes.—*Amer J Hyg* 1939 Sept. Vol. 30 No. 2. Sect. C. pp. 41-48. [13 refs.]

The author has made counts of erythrocytes, reticulocytes and ring forms of parasite in a case of *Plasmodium vivax* infection. The counts were made after the ninth, eleventh and seventeenth rigors. Rings were found in both reticulocytes and mature erythrocytes, but the former were infected over a hundred times as frequently as the latter. The earlier the count was made after the rigor the greater was the percentage of reticulocytes infected. This was the case all through the observation period, though the malarial parasites decreased in number while the reticulocytes increased. During the early stages of the malarial infection, when the number of reticulocytes was small there was a transient increase in their number with each attack of fever. Later when the number was large this transient increase was not

apparent. It is concluded that it is the stickiness of the reticulocytes which accounts for the frequency of their infection with the rings of *P. vivax*
C M Wenyon

GREIG (E D W) & NEIL (Alexander) Observations on Haemoglobin, Reticulocytes, and Blood Sedimentation Rate in Cases of Therapeutic Malaria and the Effects of Treatment of them—*Jl Trop Med & Hyg* 1939 Sept. 15 Vol. 42, No 18 pp 277-281 With 8 graphs.

A summary is given of previous observations on reticulocytes in malaria and blackwater fever FAIRLEY and BROMFIELD [this *Bulletin* 1934 Vol 31 p 176] observed that reticulocytes in cases of malaria varied from 0.6 to 10.9 per cent of the red cells they found that blood destruction in malaria was followed by a compensatory hypertrophy of red bone marrow normoblastic not megaloblastic as in pernicious anaemia. MENON KRISHNASWAMY and ANNAMALAI [this *Bulletin* 1935 Vol 32 p 789] found that in ten cases of acute malaria the average percentage of reticulocytes was 1.06 and in chronic cases 3.55 when quinine was given the counts began to rise after two or three days and continued to rise for another two or three days BLACKIE [this *Bulletin* 1935 Vol 32 p 832] found that in blackwater fever erythropoiesis is inhibited as manifested by a low reticulocyte count but with the cessation of haemolysis the reticulocyte count rises rapidly Other observations along the same lines are recorded.

In the present note the authors place on record observations made by them in the course of investigations on a large number of cases of general paralysis treated by *Plasmodium vivax* On a number of these cases a continuous series of observations was carried out on the haemoglobin reticulocytes and blood sedimentation rate

The authors give the following summary of their work and the conclusions drawn —

(1) *Reticulocytes*—The reticulocytes were enumerated in a series of cases of malarial infection and the results recorded In all cases an increase in number of reticulocytes followed at varying intervals the administration of specific drugs, quinine and plasmoquine co In a non malarial case in which full doses of quinine had been given for fourteen days no increase of the number of reticulocytes was observed. It would appear that administration of quinine in malarial infections brings about a haemolysis followed by an erythropoiesis, and this observation tends to support the well-known view that under certain conditions quinine may be a factor in precipitating an attack of blackwater fever Also it supports the observation of Machwladze and Kurpanova (1933) and their suggestion that an enumeration of reticulocytes before and after administration of quinine might be of help in the diagnosis of cases of latent malaria.

(2) *Haemoglobin*.—Associated with the rise in the number of reticulocytes in the cases of malaria there was a marked fall in the haemoglobin curve the extent of which varied in different cases. Estimation of haemoglobin can be easily carried out and should be undertaken along with other measures in the management of cases undergoing malaria therapy as it will give useful information in respect of the progress of the case

(3) *Sedimentation Rate*—There was a definite increase in the rate during the malarial infection. Following administration of specific drugs it did not increase as the reticulocyte count did, but tended to return gradually to normal. This test can be easily carried out also and would give useful information in cases treated by malaria
IV Yorke

LESNIÉ CAYLA & LICHTENBERGER. Paludisme d'inoculation chez un nourrisson de 7 mois après injection de sang paternel. [Infant of Seven Months Infected with Malaria by Injection of Father's Blood.]—*Rev. du Paludisme et de Méd. Trop.* Paris 1939. July 15 Vol. 1 No. 3. pp. 92-94 [18 refs.]

An infant very ill with broncho-pneumonia received intramuscular injections of his father's blood. Two months later the infant developed a fever of quartan type. At that time no parasites were found in the blood but the fever responded to quinine. During a subsequent relapse *P. malariae* was found in the blood. The infant had never been outside Paris. The father had left the Cameroons 13 years previously; there he had suffered from fever. He had had no fever since his return to France. Examinations of his blood revealed no parasites.

N IV

NABARRO (David) & EDWARD (Derrick G.) Accidental Transmission of Malaria to a Child by the Injection of Blood.—*Lancet* 1939 Sept. 2. pp. 556-558.

An infant suffering from melaena neonatorum was treated by an intramuscular injection into the buttock of 7 cc. of her father's blood. When ten weeks old she was readmitted to the same hospital in London suffering from quartan malaria. Numerous *P. malariae* were found in the blood. She died. There was no probability that the infant could have acquired the infection naturally in England. Her father had lived in Ceylon for many years where he took prophylactic quinine; he was unaware that he had ever been infected with malaria. He left Ceylon 12 years ago and has enjoyed perfect health since. Ten cc. of his blood was injected into a patient requiring malaria therapy; no evidence of malaria infection being forthcoming the patient was inoculated with *P. ovale*. Soon after he had developed this form of malaria parasites of *P. malariae* appeared in the blood and subsequently predominated.

It is concluded that all who have had malaria or who have lived in malarious countries are not suitable as blood donors. Infants and children are particularly liable thus to acquire malaria accidentally. In latent malaria the parasites are probably of low virulence and may be unable to infect adults.

N IV

GONZÁLEZ BARRERAS (Pedro) Colorantes azoicos y paludismo.—[Azo Dyes and Malaria.]—*Bolet. Oficina Sanitaria Panamericana*. 1939 Aug. Vol. 18. No. 8. pp. 753-757.

The author has treated eight cases of malaria in Havana with rubrazol (prontosil) with favourable results. Fever fell to normal rapidly and schizonts of *P. vivax* and *P. falciparum* disappeared from the peripheral blood within 60 hours. It has, however, no effect on the gametocytes of *P. falciparum*.

N IV

YOUNG (Martin D.) & McLENDON (Sol B.) Treatment of Induced Malaria in Negro Patients with Mapharsen and Tryparsamide.—*Public Health Rep.* 1939 Aug. 18. Vol. 54. No. 33. pp. 1509-1511.

Ten negro patients who had been infected for therapeutic purposes with *P. malariae* were given mapharsen 0.04 gm. intravenously once a

week for 10 weeks. Eleven other similar patients received tryparsamide treatment. Mapharsen relieved the symptoms of malaria but in no single case did it eradicate the parasites. The blood of all ten patients treated with it still contained parasites 22 weeks after the completion of the treatment. Subinoculations with the blood of two of these patients showed that the parasites remained viable. Tryparsamide was equally impotent against the parasites. As these drugs relieved symptoms of malaria without eradicating infection reliance on their use might result in quartan malaria carriers being released from hospital with the danger that foci of infection of a type of malaria rare in the U.S.A. might be established. *P. malariae* is favoured in malaria therapy there being but little immunity against it. It is, moreover, reliable and the rest periods between paroxysms are in its favour.

N IV

CASINI (Guido) Trattamento della malaria in campagna con adrenalina per via endovenosa [Treatment of Malaria in Rural Area by Intravenous Adrenalin].—*Riv di Malarologia* Sez. I 1939 Vol. 18 No 3 pp 189-193. English summary

In two small rural communities in Sardinia selection was made of persons between 6 and 50 years of age suffering from malarial splenomegaly who were exempt from concomitant pathological conditions that would contraindicate intravenous adrenalin therapy. These were divided into two strictly comparable groups the one group receiving treatment according to Ascoli's method the other being untreated controls. In one community there were 24 cases treated and 24 controls in the other 24 treated and 12 controls. The treatment was carried out in the spring and summer of 1939 and the members of both groups were kept under observation till the close of the year. It was found that doses of 1/10 and 1/20 mgm. of adrenalin were generally productive of extreme pallor cyanosis tachycardia arrhythmia, and severe headache. In one case such disturbances lasted three weeks. Adrenalin did not activate latent malaria infections. There was no significant difference between the number of malaria attacks in the two groups. There was no greater diminution in the size of the spleens in the treated groups than was observed in the untreated controls. No improvement of the blood or of the general condition of the patients could be ascribed to the adrenalin therapy.

N IV

MAROTTA (Gaetano) Osservazioni sul trattamento con adrenalina di malarici ospedalizzati. [Adrenalin Treatment of Malaria in Hospital].—*Riv di Malarologia* Sez. I 1939 Vol. 18 No 3 pp 199-210. English summary

This is a detailed record of 24 patients suffering from malaria treated in hospital by Ascoli's method and two treated with adrenalin by mouth. Febrile manifestations before and during treatment were treated with quinine. The recorded observations justify the author's conclusions that adrenalin is without action on the manifestations of malaria does not shorten the disease and does not reinforce the action of quinine. It does not prevent relapses. Intravenous injections produce a contraction of the spleen which lasts from 3 to 4 minutes.

The size of the spleen immediately after treatment and later is determined by the number of attacks of fever suffered and the adequacy of their quinine treatment. No evidence was forthcoming that adrenalin improved the blood or the patient's general condition. The temporary circulatory and other disturbances that follow the intra-venous injections may cause disquiet to the physician who is unfamiliar with them. N IV

PIZZILLO (Giuseppe) *Sindromi nervose da malaria e loro terapia splenocontrattile venosa. (Nervous Syndromes of Malaria and their Treatment with Intravenous Adrenalin).*—*Riv. di Malariologia* Sez. I. 1939 Vol. 18. No. 3 pp. 211-221 [10 refs]

The author passes in review the various forms of implication of the nervous system met with in malarial infections and describes in detail three illustrative cases. One exhibited a cerebellar syndrome as a complication of a primary attack of subtertian malaria that failed to respond to intensive quinine therapy. The other two were more chronic forms of malaria complicated with sciatica. The recovery of all three was brought about by treatment with intravenous injections of adrenalin according to Ascoli's method. N IV

ANDER (N) *Five Years of Anti-Malaria Work at Barwadih Railway Settlement.*—*Indian Med. Gaz.* 1939 Aug. Vol. 74 No. 8. pp. 472-476 With 1 chart.

Barwadih is a railway settlement, 349 miles west of Calcutta in the hilly tracts of the Ranchi plateau, Bihar. It was highly malarious. *A. cadefasciatus* has been found infected. Other potentially dangerous species that occur locally are *fenestus stephensi maculatus* and *lustoni*. The topography is described as are the persistent efforts that have been made through five years to control anopheline breeding. The results have been good. The spleen index which was 47 in 1932 was only 6 in 1936. In the same period the parasite index was reduced from 48 to 0.7 and the loss of days of work occasioned by malaria from 3 059 to 1 179. N IV

O'NEILL (John H) *Concrete-lined Ditches for Mosquito Control.*—*American City* 1938. Aug. Vol. 53. No. 8. p. 38. [Summary taken from *Public Health Engineering Abstr.* Washington. 1939 Sept. 30 Vol. 19 Signed Howard M. Huxer]

Proper maintenance of road-side ditches presents quite a problem where grades are necessarily flat and where soil erodes easily and vegetation grows rapidly. Under such conditions pools of shallow water readily accumulate which are favourable to mosquito breeding. Cleaning of these unlined ditches often results in cutting the bottom below grade thus increasing the number of pools.

Such conditions were overcome at Norco La. through cooperation of the Louisiana State Department of Health, a large oil refinery and W.P.A. officials. Through these agencies a reinforced concrete-lined ditch was constructed on a sand fill to the exact grade. Templates were used on 1 in. x 4 m. guide rails to insure proper cross section. Cement was of 1 2 4 mix and mixed entirely by hand. Top forms

were left in place for two hours the top layer of concrete having been rodded in place by leaves from automobile springs. After initial set a sand cement finish was applied by hand and the ditch flooded to insure good cure. Bottom of the ditch was sloped to one side to accumulate small flows. The article shows several photographs during successive stages of construction.

KUBO (Michio) & OHITO (Eijuro) About a New Mosquito-Larvicide Oil—*Jl. Oriental Med* 1939 Sept. Vol 31 No 3 [In Japanese pp. 407-409 English summary p 36.]

Though many kinds of mosquito control methods have been reported in various parts of the world they are not so suitable for practical use in Manchoukuo.

So we have studied a new larvicide oil and obtained the following very satisfactory result.

Material a. Dapus oil, b. Leave [²residual] oil, both produced abundantly in the process of oil manufacture in Fushun oil factory.

Doses mix equal parts of the two kinds of oil and use 1 L[itre] per 1 5-2 acres for rice fields. Higher doses are preferable for ponds or marshes.

Oiling Drip cans may be used for automatic oiling of irrigating streams of rice fields. They may be used as follows. A nail is driven through the bottom of the receptacle and a piece of wool wrapped round the head of the nail. By pulling on the latter the flow may be regulated. For ponds or marshes, use of spray pump is advisable.

Result Not only mosquito larvae die in one day but also other insects harmful to rice plants are injured. And of course the oil is harmless to the rice plant.

SYDDIG (M M) Some Observations of Practical Importance and Interest for the Malarialogist.—*Indian Med Gaz* 1938. Nov. Vol. 73 No 11 pp 676-678. [Summary taken from *Public Health Engineering Abstr* Washington. 1939 Sept 30 Vol. 19 Signed H. A. JOHNSON.]

The author describes a method for mixing up mud balls weighing about two ounces which contain 2 per cent. Paris green. These balls when added to water liberate Paris green which is fatal to culex as well as anopheles larvae, provided the water depth is not over five feet. Two balls are sufficient for about 8 cu. feet of water. One per cent. Paris green applied once a week to rice crops did not damage the plants whereas two per cent. was destructive to the crop. Dewatering and drying up of the mud in paddy fields has a decidedly detrimental effect on the water forms of mosquitoes although the pupae seem to be less affected. The program of alternately flooding and drying rice fields in 6-day cycles is said to be very effective in controlling mosquitoes. A formula for a repellent cream is given consisting of oil of citronella coconut oil and other substances. The cream is said to be clean simple to apply and the effects are more lasting than the preparation usually employed.

SEN (Purnendu) Can Paris Green kill Fish?—*Bengal Public Health Jl* 1939 June. Vol. 1 No 1 pp. 9-12

The author's experience leads him to believe that Paris green, in the amounts generally used as a larvicide cannot cause the death of fish

The size of the spleen immediately after treatment and later is determined by the number of attacks of fever suffered and the adequacy of their quinine treatment. No evidence was forthcoming that adrenalin improved the blood or the patient's general condition. The temporary circulatory and other disturbances that follow the intravenous injections may cause disquiet to the physician who is unfamiliar with them.

N II

PIZZILLO (Giuseppe) *Sindromi nervose da malaria e loro terapia splenocontrattile venosa* [*Nervous Syndromes of Malaria and their Treatment with Intravenous Adrenalin*].—*Riv di Malariologia*. Sez. I 1939 Vol. 18. No. 3 pp. 211-221 [10 refs.]

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V II

ARMED (N) Five Years of Anti-Malaria Work at Barwadih Railway Settlement.—*Indian Med Gaz.* 1939 Aug Vol. 74 No. 8 pp. 472-478. With 1 chart.

Barwadih is a railway settlement, 348 miles west of Calcutta in the hilly tracts of the Ranchi plateau Bihar. It was highly malarious. *A. culicifacies* has been found infected other potentially dangerous species that occur locally are *funestus*, *albopictus*, *maculipes* and *ludlowi*. The topography is described as are the persistent efforts that have been made through five years to control anopheline breeding. The results have been good. The spleen index which was 47 in 1932 was only 6 in 1938. In the same period the parasite index was reduced from 48 to 0.7 and the loss of days of work occasioned by malaria from 3 059 to 1 179.

N IV

O'NEILL (John H.) Concrete-lined Ditches for Mosquito Control.—*American City* 1938. Aug Vol. 53, No. 8 p 38. [Summary taken from *Public Health Engineering Abstr.* Washington, 1939 Sept 30 Vol. 19 Signed Howard M. Huxst.]

Proper maintenance of road-side ditches presents quite a problem where grades are necessarily flat and where soil erodes easily and vegetation grows rapidly. Under such conditions pools of shallow water readily accumulate which are favourable to mosquito breeding. Cleaning of these unfined ditches often results in cutting the bottom below grade thus increasing the number of pools.

Such conditions were overcome at Norco La. through cooperation of the Louisiana State Department of Health, a large oil refinery and W.P.A. officials. Through these agencies a reinforced concrete-lined ditch was constructed on a sand fill to the exact grade. Templates were used on 1 in x 4 in. guide rails to insure proper cross section. Cement was of 1 2 4 mix and salbed entirely by hand. Top forms

were left in place for two hours the top layer of concrete having been rodded in place by leaves from automobile springs. After initial set a sand cement finish was applied by hand and the ditch flooded to insure good cure. Bottom of the ditch was sloped to one side to accumulate small flows. The article shows several photographs during successive stages of construction

KUBO (Michio) & OHITO (Eijiro) About a New Mosquito-Larvicide Oil.—*Jl Oriental Med* 1939 Sept Vol. 31 No 3 [In Japanese pp 407-409 English summary p 36]

Though many kinds of mosquito control methods have been reported in various parts of the world, they are not so suitable for practical use in Manchoukuo

So we have studied a new larvicide oil and obtained the following very satisfactory result.

Material a. Dapna oil, b. Leave [? residual] oil, both produced abundantly in the process of oil manufacture in Fushun oil Factory

Doses mix equal parts of the two kinds of oil and use 1 L [litre] per 1 5-2 acres for rice fields. Higher doses are preferable for ponds or marshes.

Oiling Drip cans may be used for automatic oiling of irrigating streams of rice fields. They may be used as follows. A nail is driven through the bottom of the receptacle and a piece of wool wrapped round the head of the nail. By pulling on the latter the flow may be regulated. For ponds or marshes, use of spray-pump is advisable

Result Not only mosquito larvae die in one day but also other insects harmful to rice plants are injured. And of course the oil is harmless to the rice plant.

SYDDIQ (B. M.) Some Observations of Practical Importance and Interest for the Malarologist.—*Indian Med Gaz* 1938 Nov Vol. 73 No 11 pp 676-678. [Summary taken from *Public Health Engineering Abstr* Washington, 1939 Sept. 30 Vol. 19 Signed H. A. JOHNSON]

The author describes a method for mixing up mud balls weighing about two ounces which contain 2 per cent. Paris green. These balls when added to water liberate Paris green which is fatal to culex as well as anopheles larvae, provided the water depth is not over five feet. Two balls are sufficient for about 8 cu. feet of water. One per cent. Paris green applied once a week to rice crops did not damage the plants whereas two per cent. was destructive to the crop. Dewatering and drying up of the mud in paddy fields has a decidedly detrimental effect on the water forms of mosquitoes although the pupae seem to be less affected. The program of alternately flooding and drying rice fields in 6-day cycles is said to be very effective in controlling mosquitoes. A formula for a repellent cream is given consisting of oil of citronella, coconut oil and other substances. The cream is said to be clean, simple to apply and the effects are more lasting than the preparation usually employed.

SEN (Purnendu) Can Paris Green kill Fish?—*Bengal Public Health Jl* 1939 June, Vol. 1 No 1 pp 9-12.

The author's experience leads him to believe that Paris green in the amounts generally used as a larvicide cannot cause the death of fish

N W

D

LARTIGUE (Jean) GERMONT-LAU (Jean) MEONIN (Julien) & LAUREN (Loula) Prophylaxie et traitement du paludisme dans le département d'Alger [Prevention and Treatment of Malaria in the Department of Algiers].—*Rev. du Paludisme et de Méd. Trop.* Paris 1939 July 15 Vol. 1 No. 3 pp 86-91

- i. SCHILLING (Claus) Immunizzazione contro la malaria. [Immunization against Malaria].—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol 2 Pt 2. pp 365-374
- ii. — Schutzimpfung gegen Malaria.—*Deut. Med. Woch.* 1939 Aug 11 Vol 65 No 32 pp 1284-1287

i. This lecture deals with problems of immunity against malaria infection apart from pre-munition and summarizes some of the results of experiments carried out by the author during recent years. It is possible to inject about 100 schizonts or sporozoites into a healthy human being without giving rise to fever or the appearance of parasites in the peripheral blood. The human body thus has a minimal, but fundamental, resistance to malaria. Is it possible by repeated inoculation of malaria parasites to increase this minimal natural resistance to the point of obtaining real immunity without producing the disease with fever and parasites in the blood? Such an increased resistance against schizonts can be conferred. Three patients received first injections of 750, 1,000 and 1,250 schizonts respectively. In three subsequent injections the dose was increased to 50,000, 60,000 and 80,000 schizonts without giving rise to any febrile manifestations. Another person receiving an injection of 1,000 schizonts developed a mild attack of malaria after a prolonged incubation. The author raises the question of the applicability to malaria therapy of this method of inoculation by increasing doses. This immunity against schizonts does not postulate immunity against sporozoites: the application of infected mosquitoes to the patients immunized against schizonts was invariably followed by infection. If sporozoites be injected subcutaneously in small non-infecting doses the immunizing results are very small. Twelve volunteers received doses of from 200 to 1,600 sporozoites: in seven neither fever nor parasitaemia followed but increased doses produced infection in all. In these attempts at immunization other factors than the nature of the antigen are important: the chief being the receptivity of the individual treated: this varies greatly. Experiments are now in progress in which sporozoites are being injected intravenously. One patient has received in the space of two months four intravenous injections of 100, 500, 2,500 and 8,000 sporozoites respectively without any febrile reaction.

An attempt has been made to try to use anti-schizont immunity which is readily conferred as a basal immunity and to reinforce it by the subsequent injection of sporozoites. Three men were vaccinated till they were able to withstand doses of 27,600, 27,600 and 32,000 schizonts: then the injection of sporozoites was begun. One was infected after the 5th injection of 1,200 sporozoites. The other two who received 4 and 2 injections were not infected. These two were then bitten by infected mosquitoes. One was infected: the other has remained without fever and without parasites in the blood for three months.

The ultimate objective of this work is the discovery of a method of vaccinating against malaria. The author discusses the benefits that

such a procedure might confer and refers to the many problems that will have to be solved.

The experiments were confined to *P. vivax*

ii. This is an account of the same work.

[Reference may be made to the work of SERGENT SERGENT and CATANEI this *Bulletin* 1924 Vol. 21 pp 139 289 290 See also SCHILLING this *Bulletin* 1938 Vol. 35 p 429] N IV

SCHILLING (C) Immunisation contre le paludisme [Immunization against Malaria].—*Rev du Paludisme et de Méd Trop* Paris. 1940 Jan. 15 Vol. 2. No 7 pp 8-11

This is a précis of the work of SCHILLING abstracted above

GIOVANNOLA (Arnaldo) I plasmodi aviani [Bird Malarial Parasites].—*Riv di Parassiti* Rome. 1939 Sept Vol. 3 No 3 pp 221-266 With 4 figs. & 3 coloured plates [193 refs.]

In this article the author discusses in a comprehensive manner the malarial parasites of birds. He considers the various species which have been described and comes to the conclusion that 15 of these are valid. In three excellent coloured plates with five figures for each the characters of these 15 species are depicted. A list of birds from which malarial parasites have been recovered is given as also a list of mosquitoes which have been infected with bird malarial parasites. In a final section the occurrence of exoerythrocytic schizogony is discussed. It is concluded that on account of the existence of these forms the two families Plasmodiidae and Haemoproteidae should be fused as one. To the reviewer it seems that two arguments may be raised against this procedure. The one is that exoerythrocytic schizogony has been demonstrated in only certain forms of bird malarial parasites and the other is that erythrocytic schizogony is a feature of all the Plasmodiidae and of none of the Haemoproteidae. There is thus a definite point of distinction between the two families. The paper is a very valuable one which will be of the greatest assistance to those who have to work with bird malarial parasites. C M Wenyon

LION (M.) Infection combinée par *Spirochaeta gallinarum* et *Plasmodium gallinaceum* [Combined Infection with *S. gallinarum* and *P. gallinaceum*].—*Bull Soc Path Exot* 1939 July 12 Vol. 32 No 7 pp 713-716

The author has infected fowls with *Plasmodium gallinaceum* and *Spirochaeta gallinarum* with the object of finding out if the one infection influences the other as in the malaria therapy of general paralysis in man. There does not appear to be any influence. The spirochaetal infection terminates in five or six days leaving an immunity to reinfection while the malarial infection persists and continues its usual course. C M W

RODHAIN (J) La réceptivité du chimpanzé *Pan satyrus* au *Plasmodium vivax* humain. [Susceptibility of the Chimpanzee to *P. vivax* of Man.].—*C. R. Soc Biol* 1939 Vol. 132. No 23 pp 69-70

In this paper the author returns to the subject of the susceptibility of the chimpanzee to *Plasmodium vivax*. One of these apes was found

LARTIGUE (Jern) GRENODILLAU (Jern) MEORIN (Julien) & LAURENS (Louis) Prophylaxie et traitement du paludisme dans le département d'Alger [Prevention and Treatment of Malaria in the Department of Algiers].—*Rev du Paludisme et de Més Trop* Paris. 1939 July 15 Vol. 1 No. 3. pp 88-91

- i. SCHILLING (Clara) Immunizzazione contro la malaria. [Immunization against Malaria].—*Rendiconti Istituto di Sanità Pubblica*, Rome 1939 Vol. 2 Pt. 2 pp. 363-374
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In this paper the author returns to the subject of the susceptibility of the chimpanzee to *Plasmodium vivax*. One of these apes was found

to be suffering from a *P. reichenowi* infection when it arrived in Antwerp from the Belgian Congo. Its blood, inoculated to two patients, failed to produce any infection, another indication that this parasite differs from *P. falciparum*. The chimpanzee was then inoculated with the blood of another chimpanzee harbouring the *P. vivax*-like parasite *P. schranki*. An infection developed after 48 days. Blood which now contained both parasites was inoculated to a patient, who acquired no infection. The chimpanzee was then inoculated with blood from a patient showing *Plasmodium vivax*. Nineteen days after the inoculation, no parasites having been detected, blood was inoculated to a patient, who acquired a mild *P. vivax* infection after an incubation period of 22 days. Blood from this patient inoculated to another chimpanzee produced no infection. It thus appears that *P. schranki* behaves as a true parasite of the chimpanzee and is not inoculable to man, whereas *P. vivax* of man, which it resembles morphologically gives rise only to an inapparent infection in the chimpanzee.

C. M. II

- i. EATON (Monroe D.) & COOPERHILL (L. T.) Immune Response of Rabbits to Injection of *Plasmodium knowlesi*—*Jl. Experim. Med.* 1939 Aug. 1 Vol. 70 No. 2 pp. 131-139
- ii. — & — Production in Monkeys of Complement Fixing Antibodies without Active Immunity by Injection of Killed *Plasmodium knowlesi*—*Ibid.* pp. 141-149. [13 refs.]

i. In the first of these papers the authors show that complement fixing antibodies are produced in the serum of rabbits in response to injections of living or dead *Plasmodium knowlesi* while the serum of rabbits which have been infected with normal or parasitised monkey erythrocytes acquires parasitocidal properties detectable by *in vitro* tests against *P. knowlesi*. This property is absorbed by normal monkey erythrocytes, so that it appears that it is largely due to an anti-erythrocyte substance. Attempts to produce passive immunity by the injection of such parasitocidal rabbit serum failed.

ii. In the second paper it is shown that though the injection of killed parasites into monkeys will stimulate the production of complement-fixing substances no detectable agglutinins or protective antibodies are produced. It thus appears that the injection of killed parasites failed to produce these protective antibodies, which it has been shown result from an actual infection.

C. M. II

BLACKWATER FEVER.

PRINCIPLES OF ABSTRACTS IN THIS SECTION

FARLEY (p. 369) shows that methaemalbumin is formed from haematin derived from the breaking down of extracorpuscular haemoglobin, and serum albumin. Like haemoglobin it is disposed of via the liver and is present in greater concentration in the circulation when the intravascular haemolysis is associated with liver disease.

GATTO and NEIL (see *Ulaeria* above, p. 361) consider that the administration of quinine in malarial infections brings about haemolysis

followed by erythropoiesis. This tends to support the view that quinine may precipitate an attack.

CHIU (p 369) reports that blackwater fever is rare in many parts of China including Kowloon where subtertian malaria is rampant and records one case in a Chinese from Shanghai.

LAMBORN (p 370) attempted to infect 50 *A. gambiae* and 50 *A. funestus* from a patient at the height of an attack of blackwater fever but tests of these failed to show infection. C H

FAIRLEY (N Hamilton) Methaemalbumin in Man (Pseudo-Methaemoglobin) —*Proc Roy Soc Med* 1939 Aug Vol. 32 No. 10 pp 1278-1280 (Soc. Therap & Pharmacol. pp 74-76)

The author summarizes in this note his personal investigations on methaemalbumin made in London and Macedonia during the last five years. Most of the information given here has already been recorded elsewhere [this *Bulletin* 1937 Vol 34 p 841 and 1939 Vol 36 p 885]. A description is given of the spectrum of methaemalbumin, of its general chemical behaviour and of its synthesis *in vitro* and *in vivo*. The following are the author's conclusions —

"The general conclusion reached as a result of these investigations is that in man methaemalbumin is formed from extracorporeal haemoglobin when blood is destroyed in large quantities and remains in the circulation for a sufficient period of time. During the extracellular catabolism of haemoglobin the molecule is split into globin and haem. The haem is oxidized to haematin which promptly unites with serum albumin to form methaemalbumin, the latter not passing through the kidney and never appearing in the urine. Recent work by Runkington indicates that haematin injected intravenously produces an increased porphyrin excretion in the faeces. In view of these findings and the observations of Duesberg (1935) it is evident that, like bilirubin, methaemalbumin is disposed of via the liver and would be present in greater concentration in the circulation when intravascular haemolysis was associated with liver disease. This I have recently confirmed clinically in cases of cirrhosis of the liver and splenomegaly associated with haemolytic anaemia and haemoglobinuria."

IV Yorks

[A reference to blackwater fever is contained in the paper by GREIG and NEIL see Malaria p 361 above.]

CHIU (P P) The Occurrence of Blackwater Fever in the New Territories of the Kowloon Peninsula (Hong Kong). Report of a Case.—*Chinese Med J* 1939 Aug Vol 56 No 2. pp. 157-158

Chiu writes that considering the high incidence of malaria in many parts of China it is surprising to find that blackwater is a comparatively rare disease. He records that SEATON states that it is only found in Yunnan, Hainan Island and occasionally in the South China ports.

Chiu gives details of a case of blackwater fever encountered in the New Territories of the Kowloon Peninsula, a district where malignant tertian malaria is rampant and blackwater fever apparently extremely rare.

The patient was a Chinese aged 28 years and was admitted to the University Medical Unit with a history of fever for ten days, and passage of red urine for six days. He was an emigrant from

Shanghai and for two years had been employed as a coolie in the Hong Kong Mines in the New Territories.

Details are given of the results of blood and urine examination.

W 1

NYASALAND PROTECTORATE. ANNUAL MEDICAL AND SANITARY REPORT FOR THE YEAR ENDING 31st DECEMBER, 1938.—[Malaria pp. 46-47 LAMBORN (W. A. S.)]

Lamborn fed 50 *A. gambiae* and 50 *A. fowkesi* on a European patient at the height of an attack of blackwater fever and subsequently the majority of these fed on two native boys of 10 years of age between the 7th and 32nd days. There were no reactions in either of the boys, who have been under observation for 4 months. No parasites were found in a search of 17 of the *A. gambiae* and 14 of the *A. fowkesi* used in the experiment
C IV

BALYERJEE (Bibhut Bhosan). A Note on the Etiology and Treatment of Black Water Fever.—*Calcutta Med J.* 1939 Sept Vol. 36 No 3. pp. 187-189

BACILLARY DYSENTERY BALANTIDIUM AND GIARDIA INFECTIONS

PRELIS OF ABSTRACTS IN THIS SECTION

Bacillary Dysentery—STERNBERG (p. 371) reports favourably on ammonium mandelate in the treatment of gastro-intestinal infection.

SARANAKA (p. 371) describes a series of patients suffering from ekiri, a disease resembling bacillary dysentery. With HUAN (p. 372) he records two cases of mixed infection with enteric and dysentery.

Balantidial Dysentery—WESTPHAL (p. 372) describes a case of infection with *Balantidium coli* and concludes that man is not a natural host and that the ciliate alone does not cause symptoms in man. YOUNG (p. 373) reports diarrhoea and occasional dysentery in 7 patients infected with *Bal coli*. In two the ciliates disappeared after carbarsone treatment. ANCHUTTI (p. 373) found by careful measurement that the species of *Balantidium* in one human case was *coli* not *swii*.

LEVINE (p. 373) shows that for successful subculture of *Bal coli* fresh tubes of Ringer-serum-starch medium must be inoculated with at least 10,000 individuals. Growth takes place in the presence of *Ps. pyocyanea* and *Blastocystis*. LEVITASKAIA (p. 373) however describes cultures obtained from a single *Bal coli*.

Giardia Infection—With regard to the pathogenic power of *G. intestinalis* different opinions are still expressed. MAXDOUL (p. 374) states that it has no power of invading the tissues but that it may sometimes give rise to enteritis. BORMAKOV (p. 374) thinks that in the bile ducts it may irritate the mucosal lining but acts mainly by obstructing the flow of bile. DE MURO (p. 375) however considers *G. intestinalis* to be highly pathogenic in the colon, biliary passages and liver, a view which is supported by CHONAKO (p. 375). Similarly VEGHELYI (p. 375)

states that in children although the infection is symptomless in one-third it may lead to an acute disease which may become chronic. He (p 376) attributes a state simulating coeliac disease in one child and of infective fat absorption in a series of children to the adhesion by the flagellates to the intestinal mucosa and the consequent impairment of absorptive capacity

LABORDE (p 376) regards *G. intestinalis* as pathogenic and GROTT (p 376) conjectures that it might predispose to malignant disease. That it may cause intractable diarrhoea is the view of CAIN and SIKORAV (p 377) and CHOPRA *et al* (p 377) think that in some cases in children it may lead to intestinal disturbance. [Reference may be made to the discussion of this subject by WENYON in his *Protozoology* 1928 p 703 *et seq*]

Treatment by atebuin in the doses usually employed in malaria, and given by the mouth was found to be very effective by a number of authors but DE MURO (p 378) and GROTT (p 379) report even better results with acranil (Bayer) a hydrochlorate of a new acridinic compound. C IV

STERNBERG (Gunnar) Behandling av gastro-intestinala infektioner med ammoniummandolat. [Treatment of Gastrointestinal Infections with Ammonium Mandelate].--*Nordisk Med* 1939 Oct 28. Vol. 4 No 43 pp 3210-3214 English summary

Three cases of colitis and 9 of acute gastritis or gastro-enteritis were treated with ammonium mandelate. Doses of 5 cc. twice daily by mouth until the consistency of the stools became normal were used in acute cases three times daily for a week at a time in chronic cases. The results in severe acute cases were good and rapid cure being achieved in one to three days. There are no harmful effects. The author suggests that this treatment be tried in severe diarrhoea of infants, typhoid, dysentery and cholera. C IV

SAKANAKA (Tadashi) Klinische Beobachtungen ueber Dysenterie und Ekiri in der Stadt Okayama. [Clinical Observations on Dysentery and Ekiri in Okayama State].--*Okayama Igakkaï-Zasshi* (*Mist & Med Gesellsch. & Okayama*) 1939 June Vol 51 No 6 [In Japanese pp 1377-1384 [15 refs] German summary p 1385] [Summary appears also in *Bulletin of Hygiene*]

Ekiri is the name given to a disease resembling bacillary dysentery with severe toxic symptoms [see this *Bulletin* 1936 Vol 33 p 709]. Among the 105 cases with which this article deals five at least and perhaps more were instances of ekiri. All were seen in the Okayama hospital during 1937. In 77 [the author states 78 but his figures total one less] he isolated and typed the organism according to Futaki's classification. In two the organism being komagome-A the course was severe and prolonged but both recovered. In 59 with komagome-B 18 were mild 28 moderately severe and 12 very severe of whom 11 died. The course in these also was long and in children particularly closely resembled ekiri. It was among these that the fatalities occurred. Eight were attacked by the kawase organism. the course in these was somewhat shorter than the last named but at the onset there were marked toxic symptoms. Six with Nakamura's organism ran a milder only moderately severe course and not prolonged. two with Ohara's

organism ran a severe course with symptoms like ekin and both died. One due to *Schmitz bacterium*, was a mild case in the 78th the type was not determined, but the disease was mild.

Of the 27 from whom the organism was not isolated, 7 were children, 5 had a severe ekin-like attack and 3 of them died of adults and aged there were ten each for the most part mild, but two of the oldest died.

H H S

SARASAKA (Tadati) & HUZII (Tosio) Ueber 2 Fälle von Mischinfektion von typhöser Erkrankung und Dysenterie. [Two Cases of Mixed Infection with Enteric and Dysentery]—*Okayama Igakkaï Zasshi* (Mitt. d. Med. Gesellsch. z. Okayama). 1939. June Vol. 51 No. 6. [In Japanese pp. 1388-1396 With 3 charts. [20 refs.] German summary pp. 1396-1397]

Enteric fever mainly paratyphoid, and dysentery together are not common the authors affirm that till the time of their recording these two cases ten only had been recorded in Japan. The two here mentioned they saw in the summer of 1937

The first was a man of 23 years admitted with suspected dysentery but his blood showed marked leucopenia and there was cerebral disturbance with fever and troublesome diarrhoea. From his blood *Bact. paratyphorum B* was grown and from the stool Kawase's dysentery bacterium [Futaki's classification] In spite of all treatment the disease progressed rapidly to a fatal issue.

The second was a boy of 12 years under treatment for typhoid fever. During convalescence he suddenly developed dysenteric symptoms—diarrhoea, tenismus, tenderness over the sigmoid. Dysentery koma group-B organism was isolated from the stools and his serum agglutinated both this and *Bact. typhorum*. This patient made an uneventful and fairly speedy recovery

H H S

DE MELLO (F) & VAGA (A) Premier cas de balantidiose humaine observé à Goa. [First Human Case of Balantidium Infection observed at Goa.]—*Bull. Soc. Path. Exot.* 1939 Jan. 11 Vol. 32 No. 1 pp. 33-39

WESTPHAL (Albert) Experimentelle Untersuchungen ueber einen als chronische Balantidiose erscheinenden Krankheitsfall. [Experiments in Connexion with a Case of Apparent Chronic Balantidial Infection.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1939 July Vol. 43. No. 7 pp. 299-306.

A woman sixty years of age suffering from some form of intestinal derangement was found to have a *Balantidium coli* infection. Treatment with acranil brought about an apparent disappearance of the ciliate infection while subsequent treatment with yafren and emetine improved the patient's condition. Material was inoculated by a special technique into the caecum of two rabbits both of which acquired a ciliate infection, thus proving that the disappearance from the patient was more apparent than real. One of the rabbits died of wasting associated with diarrhoea, the ciliate being found in the caecum. The second rabbit lost its ciliate infection but contracted a diarrhoea with cachexia. In rabbits experimental balantidial infection is symptomless so it is concluded that in the case in question there was in addition to the ciliate infection also one with pathogenic bacteria. The patient

was not seen again for four years when a re-examination revealed a heavier balantidial infection than had been present four years earlier. Nevertheless the patient was in better health. It is concluded that human beings are not natural hosts of *Balantidium coli* and that when symptoms are present these are due to some bacterial infection which may only be detected by experiments like those carried out in the case described. C M Wenyon

YOUNG (Martin D) *Balantidiasis*.—*Jl Amer Med Assoc* 1939 Aug 12. Vol. 113 No 7 pp 580-584 With 6 figs [11 refs.]

The paper reports seven cases of infection with *Balantidium coli* in mentally defective patients of the South Carolina State Hospital and two other cases from Tennessee noted by MELENEY. The patients had chronic diarrhoea and occasional dysentery. From two of the cases the ciliates disappeared with carbarsone treatment. It seems from the habits of the patients that infection is probably from man to man rather than from pig to man as is usually the case. Before the present report there had been recorded in the United States 32 cases from 16 States. The present paper reports a further nine cases together with two more also from Carolina, mentioned in an addendum. The paper is illustrated with photographs of the ciliate and its cyst.

C M W

ARCHETTI (Italo) Zur Artfrage des *Balantidium im Menschen*. [*Species of Balantidium in Man*.]—*Ztschr f Parasitenk* 1938 Dec. 14 Vol 10 No 5 pp 545-548

The author has investigated a case of balantidial dysentery from the point of view of the species of ciliate present. In pigs two species *Bal coli* and *Bal suis* occur but for some unexplained reason the former alone has been found in man. The differentiation of the two species depends on careful measurements of a large number of individuals a procedure which is not usually carried out in the case of human infections. In the present instance the measurements have shown as has been the case with three infections studied by other observers that the ciliate was *Bal coli* and not *Bal suis*. C M W

LEVINE (Norman D) *Observations on Balantidium coli from Swine in Culture*.—*Jl Parasitology* 1939 Oct. Vol. 25 No 5 pp 401-404

A culture of *Balantidium coli* having been obtained from the faeces of swine on Ringer's serum-starch medium, attempts were made to commence subculture from single organisms. This was a complete failure in 76 such transfers. It was finally determined that for successful subculture fresh tubes of medium had to be inoculated with at least 10 000 individuals. The ciliates developed satisfactorily in the presence of both *Ps. pyocyanus* and *Blastocystis*. C M W

LEVITANSKAYA (P B) *Observations sur le Balantidium coli en culture* [*Balantidium coli in Culture*.]—*Med Parasit & Parasitic Dis* Moscow 1938. Vol 7 No 3 [In Russian pp 436-449 With 2 figs. [34 refs.] French summary p 449]

Working with cultures of *Balantidium coli* commenced from a single individual it was found that the dimensions of the ciliate varied with

the progress of the culture and the rate of multiplication which was most active 36 to 42 hours after subculture. Neither conjugation endomixis nor encystment was observed.

C M W

MANDOUL (Roger) Quo faut-il penser de la lambiose? Les localisations des lamblia. Leurs possibilités pathogènes. [Localization and Pathogenicity of *Giardia*.]—*Jl Méd. de Bordeaux* 1939 Jan. 21 Vol 116. No 3 pp. 52-63 [40 refs.]

In this article the author critically reviews many of the claims regarding the pathogenicity of *Giardia intestinalis*. The conclusion is reached that only under very exceptional circumstances does the flagellate invade the gall bladder and its presence in large numbers in the bile drawn from the duodenum by tubage is no indication whatever of such an invasion. Many conclusive observations bearing on this point are quoted. Similarly the supposition that the flagellate may cause ulceration of the colon is based solely on the accidental presence of flagellates in lesions due to some other cause. The flagellate has no power of invading the tissues. It is merely an inhabitant of the surface of the upper part of the small intestine where it may through some form of irritation, occasionally give rise to an enteritis. In large numbers of cases of infection there are no symptoms whatever. It is refreshing to read a careful paper such as this one at a time when the wildest claims are being made regarding the baleful influence of these flagellates on practically every organ of the body. The author's conclusion is that all that is known of the flagellate is that it lives in the duodenum, may sometimes give rise to enteritis and can be got rid of by only one drug, namely quinacrine (atebem).

C M W

BOXANNO (A. M.) Le forme cliniche della lamblia delle vie biliari. [Clinical Manifestations of *Giardia* Infection of the Bile Ducts.]—*Giorn. di Batteriol e Immunol* 1939 Sept. Vol 23. No 3 pp. 396-403. [81 refs.] English summary (7 lines)

In reviewing the symptoms of giardia infections, as so many writers have done recently the author assumes that the occurrence of a larger number of flagellates in the duodenal contents after administration of magnesium sulphate than in the contents withdrawn through the duodenal tube before its administration is evidence that the bile as it comes from the bile duct is infected with the organisms. He however goes further than this and has made X-ray examinations of the gall bladder after giving tetraiodophenolphthalein. This was carried out in 18 of the series of 37 cases. In some of the cases gall stones were seen. In six of the cases, including three in which gall stones were visible, cholecystectomy was performed. In the bile of the gall bladder of four of the patients, two of whom were cases with calculi, flakes of mucus were seen to contain large numbers of giardia, this in spite of the fact that all six cases had shown abundant flagellates by duodenal tubage. Three of the operated cases were followed for a year. The symptoms of colic previously present had completely disappeared but duodenal tubage still revealed giardia in two of the cases. As regards the symptoms due to giardia infection it would seem that in the bile ducts the flagellates irritate to some extent the mucosal lining but mainly act as mechanical obstructions to the flow of bile, giving rise to symptoms of biliary colic.

C M W

DE MURO (P) Clinical Aspects of Giardiasis.—*Acta Med Scandinavica*
1939 Vol. 99 No 1 pp 78-91 [17 refs.]

In this article which is largely a review of previous papers on the subject the author adopts the view that *Giardia intestinalis* is highly pathogenic and gives rise to actual ulcerative lesions of the colon hepatitis by invasion of the gall bladder and upper biliary passages in the liver and other ill effects. He refers to 45 cases of infection which he has himself studied. These according to the symptoms revealed may be grouped under four headings—enterocolitis, rectocolitis, entero-hepato-biliary syndrome, pancreatic insufficiency. The paper is characteristic of many which are appearing at the present time and in which it is assumed without so it seems to the reviewer any scientific evidence that the flagellates are responsible for the conditions described. [See MANDOUŁ above.] C M W

DE MURO (P) & IMPALLOMENI (R.) Studio clinico e radiologico della giardiasi. [Clinical and Radiological Study of Giardiasis].—*Polidinico Sez. Med.* 1939 Feb 1 Vol. 46 No 2 pp 61-78 With 10 figs

Of a series of 45 cases of giardiasis the authors subjected 15 to a radiological examination. This revealed conditions of duodenitis, cholecystitis, colitis and hypertrophy of the liver. C M W

CHODZKO (W) La lambliaze en Pologne. [Giardia Infections in Poland].—*Arch. Méd. Soc. et Hyg.* Brussels 1939 Apr Vol. 2. No 4 pp 339-354 [39 refs.]

In this article the author gives an historical account of giardia infections in Poland. He ranges himself on the side of those who regard the condition as serious and quotes a number of cases in which a variety of symptoms are attributable to the presence of the flagellate. He goes so far as to say there should be compulsory notification of the infection and that treatment should be carried out as a State measure. He considers that the infection is definitely on the increase though it would seem to the reviewer more reasonable to suppose that this is merely apparent and the result of the intensive advertisement which has been going on for the past few years. C M W

VÉGHÉLYI (Peter) Giardiasis in Children.—*Amer. J. Dis. Children*
1938 Dec. Vol. 56 No 6 pp 1231-1241 [21 refs.]

The author believes that giardiasis in children is symptomless or nearly so in only one third of the cases. In the others a variety of symptoms occur—anorexia, headache and dizziness, irregular and frequent movement of the bowels and uncertain abdominal pain usually after meals. The children are anaemic and thin. Muscular rigidity and pain on abdominal palpation were noted. The liver was some times palpable. Of 38 cases treated with acetarsone the infection was eradicated with disappearance of symptoms in all but three. The conclusion is that giardia infection in children is followed by an acute disease which may become chronic leading to anaemia and abdominal complaints and impeding the normal development. C M W

AUSTEN (E. E.) [D.S.O.] *The House-Fly as a Danger to Health. Its Life-History and how to deal with it.* Fourth Edition. Revised by John SMART Ph.D. Asst. Keeper Dept. of Entom. British Museum (Natural History) Economic Series No 1 25 pp With 11 figs. 1939 London Printed by Order of the Trustees of the British Museum [64]

In revising this well known pamphlet Dr Smart has not found it necessary to make any great changes. The short, useful descriptions of those flies, including the true housefly which frequent our houses and the account of the life-history of *Musca domestica* together with the notes on houseflies and disease remain almost unaltered.

Some new matter appears in the section on control. There is mention of a larva trap this consists of a platform of battens which stands over a shallow tank containing water. Manure is stacked on the platform from where the migrating maggots drop into the water below and are drowned. Electric screens and traps for adults are regarded as being still in the experimental stage. Other control measures (against flies and larvae) are described which have been proved by experience to be effective.

The pamphlet is chiefly concerned with the housefly as a domestic pest in Britain but to assist readers who require information on fly control abroad or in camps and the like there is a short list of references to other literature.

H S Lesson

MACCARTHY (D) *Comparative Results obtained by the Use of Several Mosquito Traps in a Limited Area.*—*Jl. Econom Entom.* 1939 Vol. 32, No 2 pp 216-219 With 1 fig [Summarized in *Rev Applied Entom.* Ser B 1939 Oct. Vol 27 Pt. 10 p 216]

As a result of comparing the catches obtained during July 1937 from five suction light-traps of the New Jersey vertical model distributed within the boundaries of Newark, Delaware, which enclose an area of about 1 000 acres with a population of approximately 4,500 people, it is concluded that, if no unusual topographical or sanitary conditions exist, one trap is sufficient to provide an accurate basis for estimating the density of the mosquito population in a community of a similar size. The three traps situated in the older and more densely populated part of the town showed rather higher average catches per night than the other two probably because a greater attraction was exercised by the denser population and because there were larger numbers of water-holding receptacles to facilitate breeding of *Culex pipiens*, L. It is therefore suggested that the trap should be situated in the most densely populated area. Of the 2,455 mosquitoes taken about 47 per cent. were males this indicates that males are more active than is generally supposed. Details of the catches are discussed.

HULL (J B) & SHIELDS (S. E.) *Pyrethrum and Oils for Protection against Salt-Marsh Sand Flies (Culicoides).*—*Jl. Econom Entom.* Menasha, Wis. 1939 Vol 32, No 1 pp 83-84 [Summarized in *Rev Applied Entom.* Ser B, 1939 Aug Vol. 27 Pt. 8 pp 168-167]

An account is given of laboratory and field experiments carried out over a period of two years in Georgia and Florida, which showed that salt marsh sandflies (*Culicoides*) may be excluded from houses by applying mixtures of concentrated pyrethrum extract and oil to the door and window screens. The pyrethrum concentrate was the extract of 20 lb. pyrethrum in 1 U.S. gal. refined kerosene, and the best mixtures were

1 part extract and 20 parts lubricating oil with a viscosity of about S.A.E 5 and 1 part extract 6 parts kerosene and 12 parts lubricating oil (S.A.E.10) The mixture should be evenly and thoroughly applied with a brush or rag and the rooms should then be well sprayed with standard pyrethrum extract spray to kill sandflies already inside the house The treatment was reported to give protection for 24-48 hours

SHCHURENKOVA (A. I.) & DOLMATOVA (A. V.) Technique perfectionnée de la coloration des femelles du *Phlebotomus* pour la détermination des espèces. [A Method of colouring *Phlebotomus* to determine the Species.]—*Med Parasit & Parasitic Dis* Moscow 1938 Vol 7 No 6 pp 929-931 [In Russian. French summary] [Summarized in *Rev Applied Entom* Ser B 1939 Sept Vol. 27 Pt. 9 pp 183-184]

A method of preparing specimens of females of *Phlebotomus* is described by which the structure of the spermatheca and pharynx is made very clear The insects are immersed for 18-19 hours at 60°C. [140°F] in a mixture of 5 parts formic acid (or concentrated glacial acetic acid) and one part of a 20 per cent. solution of pyrogalllic acid. The latter should be at least 24 hours old, to obtain satisfactory coloration. Instructions are also given for the preparation of specimens of *Phlebotomus* in Canada balsam.

CASTELLANI (Aldo) Some Little Known Clinical Signs Useful in the Diagnosis of Certain Tropical Diseases.—*Jl Trop Med & Hyg* 1939 Sept. 1 Vol. 42 No 17 pp 261-263 With 2 figs

The first of the four diseases referred to in this article namely chronic amoebic colitis and the three signs clinically helpful in its diagnosis—the infra-ensiform tender spot dullness in mid-axilla and a band of dullness at the right base—has already been noticed in this *Bulletin* [1938 Vol. 33 p 541] In retrospective diagnosis of pappataci fever the author found the persistent facial erythema of much value in one-fifth to one-third of the cases this sign remained for 7 and even 15 days after the temperature fell to normal. A punctate erythema of the soft palate might also be found and for the same length of time but is less characteristic as it is seen also in some cases of dengue, typhus and relapsing fever In erythematous conditions of streptococcal origin—and among these the author includes erysipelas, elephantiasis (filarial and non filarial) and the lymphangitis associated with it and scarlet fever—firm stroking with a blunt instrument is followed by a white line which remains for some ten minutes or more. He does not find it in rashes not of streptococcal origin. Lastly in about half the cases of dengue (the proportion varies between 30 and 60 per cent in different epidemics) he finds enlargement of the superficial cervical glands and sometimes the axillary and inguinal also This adenitis may persist for three weeks after the fall in temperature but suppuration never occurs It may be of assistance in differentiating dengue from pappataci fever

H H S

BAUDART (M.) Le goitre endémique dans la région de l'Ebola. [Endemic Goitre in the Region of the Ebola, Northern Congo]—*Ann Soc Belge de Méd Trop* 1939 June 30 Vol. 19 No 2. pp 129-142. With 1 map

Two foci of endemic goitre are known in the Congo one in the North and the other (Sampwe see below) in the South The northern near

the river Ebola, was studied by the author. In three areas the percentages of the population found to be goitrous were 39.5, 32.18 and 6.09. The aetiology is thought to be intimately connected with the constant drinking of the water of the Ebola or its tributaries. The condition is more common in females than in males and though it occurs in children is more frequent in adult life. It has no apparent connexion with other diseases and leads to no appreciable ill health. The author thinks that there is evidence that this affection is increasing.

In treatment no encouraging results were obtained with iodine alone and surgical measures under existing conditions are not advised. He therefore suggests that general hygienic measures, with improvement in the diet, should be undertaken, but the principal means should be to urge the natives to boil their water. C. IV

CALONNE (R.) L'endémie goitreuse de la région de Sempwe (Katanga). [Endemic Goitre in the Region of Sempwe, Katanga.]—*Ann. Soc. Belg. de Méd. Tropic.* 1939, June 30, Vol. 19, No. 2, pp. 143-155. With 1 chart, 2 & 3 figs. on 2 plates.

In the Sempwe area where goitre is endemic there are to be found not only many examples of deaf-mutism, idiocy and cretinism, as in other endemic areas, but also instances of ~~the~~ typical hypertrophy. Among 1,118 natives examined goitre was found in 274 and in addition 71 young people about the age of puberty showed diffuse hypertrophy forming a total percentage of 30.85. Females were more affected than males in the proportion of 33.19 to 8.61 per cent. in one series, but the author points out that migration of males to industrial districts is considerable and in those mining districts general hygiene is cared for. In the endemic area the gland increases in size with each pregnancy but this phenomenon is not seen in those women with existing goitre who have removed to other districts.



Epidemic goitre in grandmother, mother and daughter in the Sempwe Region, Katanga.

[Reproduced from the *Annales de la Société Belge de Médecine Tropicale*.]

In three-quarters of the cases the goitre leads to no disability in the remainder all stages of hypothyroidism are seen or signs of hyperthyroidism develop. No estimation of the basal metabolic rate has been possible but tachycardia, dyspnoea of effort, fine tremor and a temperature up to 37.6°C without apparent reason indicate the diagnosis, though exophthalmos was only seen once. The author describes the typical symptoms of hypothyroidism seen

C W

VAN DER WALLE (N) *Coccidioidomycosis*.—*Nederl Tijdschr v Geneesk* 1939 Nov 25 Vol 83 No 47 pp 5548-5554 With 5 figs. (4 on 1 plate) [13 refs.]

This article though containing no fresh contribution to the subject is valuable as summarizing knowledge up to the present. It deals with the cutaneous forms coccidioidal granuloma affecting face or extremities [see this *Bulletin* 1938 Vol 35 459] and the pulmonary form which goes also by the names of San Joaquin Valley fever or more shortly valley or desert fever of California [see this *Bulletin* 1939 Vol 36 pp 507-8]. The article is embellished with photographs showing the lesions of face and foot and of the growth of the fungus on Sabouraud-agar in the mycelial vegetative and in the spherule parasitic stages.

H H S

HAULUSSY (M) & SARDJITO *Rhinoscleroma op Flores*. [*Rhinoscleroma in Flores*.]—*Geneesk Tijdschr v Nederl Indië* 1939 Oct. 17 Vol 79 No 42 pp. 2626-2638. With 18 figs (1 map) on 4 plates [12 refs.]

Five cases of rhinoscleroma have been discovered on the island of Flores. These are confirmed by demonstration of the bacilli, by complement fixation test and by the histological picture. But it is not so much the discovery itself as the significance of the place of occurrence which is important. In the original investigations into the disease by SNIJDERS [this *Bulletin* 1938 Vol 33 p 720] the view was put forward that the disease was one of ancient times and was dying out and that by its occurrence in Chota Nagpur British India a racial link could be suggested between people of the Munda Kolar stem with the people of the Batak Islands which would date 200 B.C. The expectation also was that a disease affecting a primitive people would not be confined to Sumatra [this *Bulletin* 1935 Vol. 32, p 73] but would be found on other islands of the same chain. This expectation has been fulfilled and we have had reports of its occurrence in Bali, Java and, now on the island of Flores. So far no cases appear to have been reported from the islands of Soembawa and Soemba.

W F Harvey

ZAKON (Samuel J) *Contact Dermatitis due to Mango*.—*Jl Amer Med Assoc* 1939 Nov 11 Vol. 113. No 20 p 1808 [Summary appears also in *Bulletin of Hygiene*]

Two cases are recorded in which 24 hours after the eating of mango an erythematous and vesicular eruption with itching and swelling of the lips appeared. Patch tests in each case showed that the peel not the fruit was the cause. KIRBY SMITH has shown that the peel before ripening contains a substance which affords protection from attack by insects and in some varieties this substance remains even

The author's final conclusion is that infection and race are not alone in giving these boys their present weight, stature and haemoglobin content and that probably nutrition is the third factor. C IV

SURRACO (C. A.) The Characteristic Features of Hospital Construction in the Tropics.—*Nomokhemon* 1939 Vol 10 No 4 pp. 265-269

In building hospitals in the tropics due regard must be paid to climatic features, ethnological characteristics especially where race are mixed, economic resources and the type of patients to be received. The principal emphasis in this paper is placed upon constructive technique.

The land at disposal should allow 200 square metres for each bed and should be on high but protected ground. Congestion in the receiving rooms should be avoided by the construction of an adequate entrance pavilion. There should be a ward for new patients before they pass on to the permanent wards on the higher floors and the sexes in these latter should be separated on different floors. The building should be raised on pillars without rooms at ground level, the space thus formed may be used for shade or the parking of vehicles.

The corridor plan should not be employed, but through ventilation should be ensured by adopting the redan system. Windows should be narrow but high and it is not necessary that they exceed in area one tenth of the floor space. Air conditioning especially in theatres, is indispensable.

The roof should be flat in terraces covered with earth and plants, and the wards should have a balcony on one side only for the use of visitors, if possible with an outside staircase. Ample corners for protection from rain and sun should be provided, but ornamentation should be avoided. C IV

STEPHENSON (A. G.) The Influence of Climatic Conditions on Hospital Construction.—*Nomokhemon* 1939 Vol 10 No 4 pp. 269-271

Part of this paper deals with conditions in cold climates but the remarks on those in tropical countries are given most weight in this abstract as being of greater interest to readers of this *Bulletin*.

Insulation against heat is fundamentally the same as insulation against cold and it is the rate of heat exchange which must be limited. In hot climates direct solar radiation is intense and protection of outside walls and roofs is desirable and of window areas essential. All hospital planning should be open and well screened and the lowest floor should be well above the ground to allow for free passage of air under the floor. Glare and reflection should be minimised and lawns and flower beds used to absorb light and heat radiated from light coloured walls.

If possible the quadrangle plan should be adopted and balconies and verandahs screened against mosquitoes should be provided on every aspect. Air conditioning, though it could be applied in certain parts of hospitals particularly theatres and out-patient halls is costly and in Australia is therefore not a sound proposition to rely on for general hospital use. It would perhaps become so if it were proved that it led to such improvement in conditions that it significantly reduced the length of residence of the patients.

In both hot and cold climates cavities and air space should always be provided as a buffer between the inside and outside conditions. Glass areas should not be reduced but should be screened. Walls with collapsible glass frames but with verandahs wide enough to give protection are therefore advised. C II

FRIMODT MÖLLER (C) The Planning of Tuberculosis Institutions in India—*Indian Med Gaz.* 1939 Sept Vol. 74 No. 9 pp 559-568. With 7 figs [Summary appears also in *Bulletin of Hygiene*]

The author shows that modern institutions require the provision of facilities for laboratory and X ray work, operative and light treatment and especially for nursing. Institutions should be placed wherever they are most needed since there is no danger of spread to surrounding uninhabited areas.

Two factors in India which require close study are the climate and the social customs and more provision for instance for the separation of the sexes is necessary in that country than in most others. The sharp distinctions once held between hospital and sanatorium are now disappearing and the comparatively new development of settlements must be taken into account.

After these preliminary remarks the author gives very complete details illustrated with plans of the construction of tuberculosis clinics and sanatoria with remarks on ventilation, privacy, hygienic features, staff quarters, ex-patients, colonies and on the location of clinics in towns. These cannot be abstracted. Modifications for other parts of India are suggested but though dealing only with India this paper contains much advice applicable to all tropical countries and authorities contemplating the construction of tuberculosis institutions in hot countries would be well advised to consult it. The author has rendered a service in giving the results of his long experience in this important but little discussed branch of tuberculosis administration in the tropics. C II

REVIEWS AND NOTICES

EDWARDS (F. W.) [Sc.D. F.R.S.] OLDROYD (H.) [M.A.] & SMART (J.) [Ph.D. Department of Entomology, British Museum (Natural History)] *British Blood-Sucking Flies*.—pp viii+156. With 45 plates (44 coloured) & 64 text figs. 1939. London. Printed by Order of the Trustees of the British Museum. [15s.]

Illustrations of British Blood Sucking Flies which consisted of coloured plates by Mr. A. J. E. Terzi and notes by the late Major E. E. Austen was published by the British Museum in 1906. The book was soon out of print and in view of the continued demand for it a series of new illustrations was prepared by Mr. Terzi in 1923 but Major Austen was never able to complete the text. The text has now been compiled by the authors cited above who have produced what is from the entomological standpoint a very attractive volume. As in the earlier work the aim of this edition has been to provide in the simplest manner information of interest to non-specialists. Technical terms

[May 1940]

are so far as possible avoided, and no attempt has been made to give full descriptions of the insects while in the Nematocera, the males (which do not suck blood) have been omitted from consideration. A brief summary has however been included of the known facts regarding the habits, life history and distribution in Britain of every blood sucking fly known to occur within the British Isles. In 1908 there were 2,700 known species of British Diptera, of which 74 were blood suckers. These figures have now grown to 5,200 and 117 respectively. The bloodsucking groups are the Culicidae Ceratopogonidae, Simuliidae Tabanidae Muscidae (Stomoxys) Hippoboscidae and the bat parasites, Nycteribidae. The book gives a compact account of the natural history of these bloodsuckers, with keys for the identification of the females. Their hygienic importance is only mentioned in passing. Methods for the control of those species that are pests of man or animal are not discussed. The work is beautifully illustrated with 45 coloured plates and numerous line drawings in the text.

V B Wigglesworth.

It is with deep regret that we record the death on March 9th of Dr A J R O'BRIEN CMG MC Chief Medical Advisor to the Secretary of State for the Colonies and Chairman of the Honorary Managing Committee of the Bureau from 1933 to the date of his death.

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No. 6

SUMMARY OF RECENT ABSTRACTS *

V LEISHMANIASIS

A VISCERAL LEISHMANIASIS.

Epidemiology

In the epidemiology of kala azar the most important recent work strengthens the opinion that the dog is the principal reservoir of the disease. In this respect ADLER *et al* (p. 443) emphasize the importance of house dogs as well as street dogs in Canea, Crete, and PAPANTONAKIS (p. 1028) refers to the growing belief that the dog is the reservoir in that district. In Marseilles GIRAUD and BERGIER (p. 1026) show that kala azar in man occurs chiefly between the ages of 1 and 3 years and that the majority of cases come from the surrounding districts or from houses in the suburbs where there are gardens. Canine kala azar is common and is found chiefly in these districts and the authors conclude that kala azar is essentially a canine disease which passes to man accidentally. SERGENT *et al* (p. 1026) state that Mediterranean kala azar appears to be transmitted by *P. perniciosus* from dog to dog and from dog to man rather than from man to man, the dog constituting the principal reservoir. MENDES (p. 1028) found leishmania in 5 of 240 dogs examined post mortem in Lisbon. FENG *et al* (p. 1027) record the skin lesions found in 12 dogs with canine leishmaniasis in Peiping and HO (p. 1027) notes that one of these dogs came from a house in which a case of kala azar in a child occurred. The lesions in the dog appeared before those in the child. CHAGAS *et al* (p. 446) in the municipality of Abiaé in the State of Pará, Brazil, where 8 cases have recently been reported, found no infection in 1,446 wild animals but among domestic animals 7 dogs and 1 cat were found to be infected. DA CUNHA (p. 1027) shows that in the dog experimentally infected with leishmania of S. American kala azar the skin becomes infiltrated with macrophages containing the parasites. The skin may appear to be quite normal or may develop areas of tumefaction in which leishmania may be found.

BLANC (p. 1026) found that a squirrel (*Xerus xerulus*) bred at the Pasteur Institute in Morocco had died of an acute leishmania infection.

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1939, Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

but the origin could not be traced. He discusses the possibility of this animal being a reservoir. In the Sudan, where visceral, oral and cutaneous infection may coexist in the same area, KIRK (p. 445) states that the visceral form, which is the most common, occurs in rural districts in the vicinity of water and in the presence of vegetation. Endemic foci in Darfur and the Blue Nile are separated by an area in which sporadic cases occur from time to time. Epidemiological evidence points to the possibility of the existence of some alternative or reservoir host.

VALLÉE and DE MONTILLAC *et al.* (p. 450) report that kala azar is becoming increasingly common in Cherbourg. ANTONOV (p. 443) shows that kala azar is not uncommon in both children and adults in the malarious districts of Yugoslavia. SHAPIRO and BYER (p. 1031) record 8 cases of infantile kala azar from Haifa. ARAR (p. 444) reports kala azar from Turkey and ROBINSON (p. 445) a case in a child in Transjordan.

SCHRETZENMAYER *et al.* (p. 445) report an outbreak in Chinese troops in Canton where the disease was not previously known. The infection was probably introduced by soldiers from N. China where it is endemic. GATTI *et al.* (p. 1032) record kala azar in a patient probably infected in N. Bolivia where the disease has not previously been reported.

Actiology

DA CUNHA (p. 447) has succeeded in infecting hamsters, monkeys and dogs with the parasite of S. American kala azar (which, though known as *L. chagasi* cannot be differentiated from *L. infantum* or *L. denovani*) by using young cultures. As a result of a series of serological tests he (p. 447) concludes that the parasite of S. American kala azar is identical with *L. infantum*. He (p. 1027) also shows that the skin lesions of dogs infected with the leishmania of S. American kala azar resemble those of dogs infected with *L. infantum* which is additional evidence in favour of the identity of the two species.

LOWE (p. 447) shows that for the cultivation of *L. tropica* and *L. denovani* (as of *Trypanosoma cruzi*) three substances are essential: haematin, ascorbic acid and an unknown substance contained in serum. Haematin and ascorbic acid are contained in washed red blood cells. The leishmania will grow in peptone media to which these three ingredients are added. ZAKHAROV (p. 1024) has cultivated leishmania on NN medium to which physiological saline or skimmed goat's milk has been added. SAKAJI (p. 1024) however considers that ordinary NN medium is not very satisfactory for the primary isolation of *L. tropica*. He describes an agar medium to which defibrinated rabbit blood is added, in the condensation water of which primary cultures are readily obtained. ARCHETTI (p. 448) has found Reschenow's medium to be suitable for the growth of leishmania. It consists of equal parts of citrated human blood and Ringer's solution, and is allowed to stand in the ice chest until the red cells have settled and become covered with a layer of leucocytes before inoculation with the leishmania.

GAVRILOV and LAURENCE (p. 445) have cultivated leishmania in cultures of tissues from the embryo of the hamster made up with heparinized blood, embryonal fluid and extract of spleen. Penetration of the cells by the flagellates, development into leishmania forms and multiplication were observed.

Transmission

The majority of the work done provides confirmation of the view that sandflies are the usual agents that certain sandflies are easily infected by feeding on dogs and that the rate of infection of the sand flies is in proportion to the number of parasites available to them but a suggestion is made that in S France the dog tick may act as vector

As noted above SERGENT *et al* (p 1026) state that Mediterranean kala azar appears to be transmitted by *Phlebotomus perniciosus* from dog to dog and from dog to man rather than from man to man they further show that the presence of parasites in the skin of dogs suffering from kala azar allows ready infection of the sandflies. A similar conclusion may be inferred from the work of DA CUNHA (p 1027) In Canea Crete where visceral and cutaneous leishmaniasis occur in adjacent but well defined areas ADLER *et al* (p 443) have shown that *P major* is the vector of the visceral disease and *P sergenti* that of the cutaneous form Canine kala azar is common in the district in which human visceral leishmaniasis occurs and the percentages of *P major* which became infected after feeding on infected dogs in different batches varied from 2 to 70 Certain other studies on sand flies are recorded.

ADLER and THEODOR (p 1025) obtained infection of *P papatasi* by allowing them to feed through a membrane on emulsions of *L chagasi* [the parasite of S American visceral leishmaniasis which is probably identical with *L donovani* and *L infantum* see above Aetiology] The percentage of flies becoming infected increases with the increase of the flagellate content of the emulsion and may rise to 89 per cent When infection has been established the flagellates multiply in the midgut and ascend to the anterior part of the cardia which may become choked with them. Passage to the oesophagus may occur as early as three days after feeding

FERREIRA *et al* (p 449) showed that the parasite of S American kala azar was able to develop in wild *P intermedicus* which had fed on infected dogs. The sandflies occur in and around the houses of the patients and breeding places have been found near the houses. The authors failed to obtain infection of laboratory bred *P intermedicus* fed on dogs but CHAGAS (p 449) later reports success in this way with laboratory bred *P intermedicus* and *P longipalpis*

FENG and CHUNG (p 1025) found that infection occurred in both *P sergenti* var *mongolensis* and *P chinensis* when fed on infected dogs but that the infection persisted only in *P chinensis* in which it extended forwards to the pharynx and proboscis. Flagellates were found in the faeces of one *P chinensis* The rate of infection was proportional to the degree of infection of the skin of the dogs. *P chinensis* is therefore a satisfactory host for the parasite of canine kala azar and if this parasite is identical with that of human kala azar this finding may throw light on the epidemiology of the human disease and supports the conclusions previously arrived at by HINDLE and other workers that in N China it is the vector concerned in man. CHUNG and FENG (p 1025) found flagellates indistinguishable from developing leishmania in *P chinensis* from the kennel of a dog suffering from kala azar and the house of its owner in Peiping

GIRAUD and BERGIER (p 1026) in Marseilles suspect the dog tick of transmission of kala azar from dogs to children. The disease in children

is common in those districts in which dogs are infected—the ticks bite children playing on the ground and children are more closely in contact with dogs than are adults (in whom kala azar is rarely found)—sandflies on the other hand bite children and adults impartially but dogs less often. The authors mention one child who suffered from boutonneuse fever followed two months later by kala azar and surmise that both infections may have been acquired at the same time by the same means.

ROBINSON (p. 445) found *P. papatasi* and *P. major* in Transjordan where he has found kala azar. *P. major* is probably the vector. KIRK (p. 445) in the Sudan shows that so far as is known, *P. langeroni* is the only sandfly which bears any relation in its distribution with that of leishmaniasis. CHAGAS *et al.* (p. 446) found *P. longipalpis* in a district of Brazil in which kala azar was present.

Pathology

MEXON (p. 1029) regards kala azar as a reticulo-endotheliosis caused by parasitic invasion of the cytoplasmic reticular syncytium with gradual formation of free parasitized histiocytes and in the later stages spread of infection to the lymphatic reticulum of the spleen. Reticulo-endothelial blockage is the probable cause of the anaemia and of the tendency to inflammatory complications. MURANO and VECCHIO (p. 1029) consider that the anaemia is due to hyperplasia of bone marrow caused by alterations in the reticulo-endothelial system brought about by the leishmania, and not to any haemolytic process.

In dogs ADLER *et al.* (p. 443) describe an infiltration of the vocal chords with infected macrophages, which probably explains the inability of some of the animals to bark.

KREMERMAN (p. 449) states that although normal human serum and serum from patients with kala azar have *in vitro* a lytic action on cultural forms of *L. donovani* their presence *in vivo* does not help in bringing about cure.

Clinical

CHENG (p. 450) regards sternal puncture as the best method for diagnosing kala azar and describes the use of a shortened lumbar puncture needle for the purpose. NAPIER (p. 1030) however though admitting that sternal puncture is a fairly accurate means of diagnosis, concludes that it has not been proved to be as reliable as splenic puncture which in his hands has not given rise to any serious effects.

Discussing the formol-gel reaction DE VRIES (p. 1029) has found it positive in many different diseases whenever the total globulin content reaches 37 parts per thousand or more. It is not specific. DA CUNHA and DIAS (pp. 451-1035) have prepared a leishmania antigen which gives very definite complement fixation reactions with sera from man or animals suffering from both visceral and cutaneous leishmaniasis. GRIVAL *et al.* (p. 1030) write of the high diagnostic value of the Witebsky-Hingenstern-Kohn reaction, which was positive in every one of 132 diagnosed cases.

PALLISTER (p. 1030) records an incubation period of one to two years in kala azar.

SCHRIFFENMAYER *et al.* (p. 445) report that jaundice was a feature in their cases in Canton, and that in one there developed acute atrophy of the liver.

VALLETEAU DE MOUILLAC *et al* (p 450) observed symptoms of meningitis with purulent cerebrospinal fluid in a child suffering from kala azar in Cherbourg. The fluid was bacteriologically sterile and they conclude therefore that the condition, which cleared up, was due to kala azar. One injection of 20 cc antimeningococcus serum had been given as a precaution.

DASTIDAR (p 1031) reports a nodule on the tongue in which leishmania were found in a case of post kala azar dermal leishmaniasis.

Treatment.

Working with normal and infected hamsters WANG (p 452) finds that solustibosan, neostibosan and ureastibamine are increasingly toxic with regard to the amount of antimony which can be administered, and are increasingly potent in cure in that order. He (p 1032) shows that daily injections appear to be less effective than bi weekly or tri weekly injections, probably due to the fact that when the antimony in the tissues reaches a certain level excretion by the kidneys becomes suddenly increased out of all proportion to the antimony in the tissues.

D OELSNITZ *et al* (p 451) give the highest tolerated doses of antimony continued over a long period. In the case of ureastibamine 0.5 ggm per kilo body weight can be given daily until a total of over 0.5 gm per kilo has been administered and with other organic antimonials this may be exceeded but careful watch must be kept for signs of intolerance. In one female patient 0.5 gm. neostibosan was given almost daily for 2½ months until a total of 34 gm. had been given.

AVERSA (p 1033) obtained good results in infants with solustibosan. MIRZOJAN (p 1033) writes in favour of soumune (stibosan) in Russia. DAS GUPTA (p 1033) reports two cases of urticaria (with unconsciousness in one and uterine haemorrhage in the other) after ureastibamine.

MATHIESON and WATSON (p 452) record successful treatment with neostam after the failure of foudadin in one patient.

Control

SERGEANT *et al* (p 1026) show that a reduction in the human reservoir of Mediterranean kala azar by treatment of all cases has not been followed by a lowered incidence of the disease. On the assumption that the dog is the principal reservoir they therefore suggest the destruction of all known infected dogs and all stray dogs, the control of the movement of dogs into and out of infected areas, the prevention of contact between children and dogs and measures for the protection against sandfly bites by nets and other means. Breeding of sandflies can to some extent be prevented by general cleanliness. PAPANTONAKIS (p 1028) shows that the destruction of the majority of the dogs in Canea in 1833 was followed by a markedly lower incidence of human kala azar in the following year. Regulations have now been drawn up insisting on inspection of all dogs in April of each year when the formol-gel tests and clinical examination are made. All positive or sick dogs are destroyed and if in a village a human case occurs all dogs of the village are destroyed or tested and the residents can only obtain new dogs which are under two months of age and which have come from uninfected villages. ADLER *et al* (p 449) emphasize that in any campaign of dog destruction both house and street dogs must be taken into account.

COON and ELLIS (p. 406) each describe the symptoms of nitritoid reactions after injections of trypanamide. In each case the reactions occurred not after the first injection but when a considerable number had been given.

Trypanosomiasis of animals.—CULBERTSON and WOTTON (p. 407) found that ablastin is produced well in rats aged 25 days or more and infected with *T. lewisi* but that in younger animals production is poor. They conclude that the power of producing ablastin is a major factor in the resistance shown by older rats which usually survive the infection. KOLODNY (p. 408) reports similar findings and conclusions in rats infected with *T. cruzi*. CULBERTSON (p. 409) shows that, as with rats infected with *T. lewisi* and *T. cruzi*, immunity to subsequent infection is transmitted in the colostrum and milk from mice infected with *T. duttoni* or passively immunized to their young. The immunity is specific.

ACANFORA (p. 409) has demonstrated multiplication of *T. brucei* in the blood of fowl embryo. BIOCCHA (p. 410) used an emulsion of infected fowl embryo to vaccinate guinea-pigs against *T. brucei* and found that this procedure prolonged the course of the disease. VANDEN BRANDEN (p. 410) found that rabbits infected with *T. brucei* gave positive complement fixation tests with an antigen of alcoholic extract of *T. brucei* whereas normal animals did not.

DUBOIS and KOHN (p. 410) discuss the action of arsenobenrol on *T. brucei* and quote experiments which favour the view that it is direct but they do not exclude the possibility that 914 acts by virtue of transformation into arsenoxide. DUBOIS and LOSNER (p. 411) show that blockage of the reticulo-endothelial system does not appear to produce any constant change in the elimination of 914 in animals.

RICHER and ARTOIS (p. 412) report that considerable immunity to reinfection is afforded to rats infected with *T. equiperdum* and given a curative dose of sulphamerol during the course of infection.

KRANEVELD and UMBON (p. 412) show that the therapeutic effect of naganol in guinea-pigs infected with *T. cruzi* is lessened if the drug is given in fractional doses with a day's interval between injections.

Chagas's Disease.—MAZZA (p. 413) reports on the incidence of Chagas's disease in the Argentine and names the animals found naturally infected and the insect vectors principally concerned.

ROUBAUD and ROMAÑA (p. 413) have shown that *T. cruzi* can survive in fowl embryo for a week, but have not demonstrated multiplication.

GASIC (p. 414) found infection in half of a series of *T. infans* examined in the province of Coquimbo Chile. HOFFMANN (p. 414) shows that in Cuba *T. fluvialis* experimentally can transmit *T. cruzi* and points out the risk of the admission of patients with Chagas's disease.

MAZZA *et al.* (p. 414) describe the pathological changes in the heart in a case of chronic disease and MAZZA and JORG (p. 415) compare the cardiac lesions with those of rheumatism. The changes in the heart observed on radiological examination are discussed by ALBERTO AGUIRRE and GIMENEZ (p. 415). MAZZA (p. 415) describes a nodular hepatitis which he regards of diagnostic importance in Chagas's disease and suggests that examination of liver and heart tissue removed post mortem by the viscerotome may be valuable in epidemiological studies. ROMAÑA (p. 416) describes the histological changes in the organs and in the eye of a monkey infected with *T. cruzi* by deposition of infected faeces of *R. prolixus* on the conjunctiva.

LETTE (p 416) concludes from the results of a series of Machado-Guerreiro complement fixation tests in goitrous patients in Brazil that goitre is not an essential part of the picture of Chagas's disease.

C IV

UGANDA PROTECTORATE ANNUAL REPORT OF THE MEDICAL DEPARTMENT FOR THE YEAR ENDED 31st DECEMBER 1938 [KAUNTZE (W H) Director]—[Trypanosomiasis pp. 38-39]

The Victoria Nyanza area remained free of sleeping sickness but clearings have been maintained and the rules enforced to prevent the disease from being introduced from other areas. No cases have been reported from the Lake Edward-George area notwithstanding the development of the fishing industry. In Gulu six monthly inspections were made of the newly-settled areas at Anaka Nwoza and Alero. Four new cases were diagnosed and six old cases treated. No new cases were discovered in Madi. In the West Nile area there were 684 cases in 1938 compared with 723 in 1937. An entomological survey was made at the end of the year and the recommendations of Mr E. G. GIBBINS who made the survey are recorded.

W Yorke

SAUNDERS (G) Trypanosomiasis Campaign—Progress Report.—*Gold Coast Rep Med. Dept Year 1938* Appendix V pp 104-107

Details are given regarding the infection rates in the various sleeping sickness areas in the northern territories. In the Lawra area the information at present is unreliable. In the Burnfoo area the average infection rate is 3 per cent. In Nadawli it is 9 per cent. In the border area between Lawra and Tumu it is 6 per cent. whilst in South Mamprussi and Kusasi it is 1 per cent. The number of patients treated in the field was 98 in Lawra Tumu 95 in Wa district and 333 in Mamprussi.

A considerable number of cases who were positive last year were found to be still positive this year and have had no symptoms nor treatment in the interval. This apparently applies to 20 per cent of last year's positive cases. At one town three miles from Gambaga the figure was 50 per cent (5 out of 10 cases).

The incidence of the disease is decreasing in Mamprussi the decrease appears to be due mainly to the clearings.

A certain amount of information is given regarding a topographical study of incidence hospitals and dispensaries and public health measures.

W J

CONGO BELGE RAPPORT SUR L'HYGIÈNE PUBLIQUE AU COGO BELGE PENDANT L'ANNÉE 1938 [VAN HOOFF (L.)]—[Trypanosomiasis pp 33-49 With 1 folding map]

Eleven Europeans suffering from sleeping sickness—ten from the province of Leopoldville and one from Coquilhatville—have been treated during the year.

The personnel of the medical service was only completed towards the end of the year 1938 and consequently it was not possible to extend the sleeping sickness work amongst the natives. The regions

discovered in the blood by microscopical examination but their presence was demonstrated for more than a month by inoculation into mice. The cock, which was suffering from a chronic infection of *Plasmodium gallinaceum* exhibited no signs of the trypanosomal infection.

IV Y

JACK (R. W.) Studies in the Physiology and Behaviour of *Glossina morsitans* Westw.—*New Dep Agric S Rhodesia* 1938 No 1 pp 4+203+vi. With 3 plates & 27 figs [37 refs.] [Summarized in *Rev Applied Entom* Ser B 1940 Feb Vol 28 Pt 2 pp 22-24.]

This paper which is divided into two parts dealing respectively with the physiology and behaviour of *Glossina morsitans* Westw. is based on the results of laboratory research carried out at Salisbury Southern Rhodesia, since 1936 and on certain data, referring chiefly to behaviour collected in the field over a number of years. A short section of the first part deals with high and low fatal temperatures and factors that may influence their variation, and with the effect of insulation. The rest of the part is chiefly concerned with the influence of atmospheric conditions on the pupae and adults, but includes such questions as the water and fat contents of the flies on emergence, the processes following feeding, the influence of pregnancy on water and fat contents, and the stimulus to feeding.

The subjects dealt with in the second part include the reactions of the flies to light, temperature, humidity etc. the attraction of flies in the field to man, animals, motor vehicles, screens, colours, and traps, the elementary positive reactions, such as those to movement, scent and shade, on which attraction depends, and finally a discussion of the feeding ground concept.

The following points are taken largely from the part of the author's summary that deals with the attraction of flies in the field. There is as yet no evidence of attraction to man other than through the external stimuli of movement or scent. Males are attracted whether hungry or not, but females only when very hungry. As regular feeding is necessary for normal reproduction, it follows that man cannot take the place of animals as a host of *G. morsitans*. Most flies that attack a stationary animal do so under the belly, usually well back, and it is suggested that they are primarily attracted by the patch of shade presented. Females with a fat content higher than those that are attracted to man may be attracted to a donkey. Flies are apparently attracted to animals by movement, scent and shade. Over the same route, more flies are attracted to a motor vehicle than to man, and although the percentage of females is no higher, their mean fat content is much greater. A moving lorry apparently attracts females that are ready to feed in spite of a considerable fat content, whereas man attracts only more or less starving females.

Dark colours are markedly more attractive than light ones, at least in the dry season, and this preference is noticeable in the case of both screens and moving natives. A dark blue screen was considerably more attractive than a live donkey. Screens of either black or brown cloth attract a higher percentage of females than a man or lorry, but black attracts a higher percentage than brown. The shady side of a black screen attracts more flies and a higher proportion of the latter females than the sunny side, at least in very hot, dry weather. Various types of traps were tested, including some designed expressly to attract flies into dark shade. Flies entered the traps when the opening was on the shady side quite as readily as when it was underneath, and in the case of one model penetrated into the very dark interior through a slit $\frac{1}{4}$ -inch wide. The percentage of females among flies caught in traps in the dry season was greater than among those caught on man or on a vehicle, and in certain

instances slightly exceeded 50. A few figures obtained in the wet season indicated that the percentages in traps and on man are then similar. There is an indication that the strong preference for dark blue or black may be exhibited only under dry season conditions, since a few tests during the rains suggest a preference for hessian. Catches in the traps which were negligible during the rains and very low during the cooler part of the dry season, rose during August and remained fairly high during September and part of October but became negligible again after the first heavy rains. The dominant factor determining the reaction to traps appears to be evaporation rate since the temperature rises as high in the wet season as in August. The falling off of catches in October may be due to the fact that the flies are inactive during the greater part of many very hot days. Restriction of shade in the late dry season is probably a factor contributing to the increased catches at this time. The nature of the attraction exercised by the Harris trap and other somewhat similar models is discussed and it is thought more likely that the flies are attracted by the patch of shade or what looks like shade than that they mistake the trap for an animal. Hunger is not apparently the primary stimulus. The reaction of a fly to stimuli (moving objects, scent shade and questionably bulky objects) is determined largely by its physiological condition, namely state of nutrition water content and pregnancy.

Hungry flies are attracted to the better illuminated spots in the forest because hunger increases activity and the positive reaction to light. After feeding, the flies usually return to shade chiefly for the processes of primary excretion and concentration of the ingested blood, but actual resting after a meal occupies a few hours at most. Female flies are presumably attracted to shady retreats for larviposition but this is a rapid process. Active flies normally range continuously through their habitat, and activity is not confined to hungry flies. A forest opening or vlei, if evergreen trees are present, and pure mopane (*Coprosia mopane*) forest, when in leaf are commonly complete habitats for the fly. It appears that the applicability of the feeding ground concept even in the modified form indicated depends greatly upon the physical conditions presented by the local forest.

GHIDINI (Gian Maria) Nuovi dati sulla distribuzione delle Glossine nelle terre dell'Impero [The Distribution of Glossina in Italian East Africa].—*Riv di Biol Colon* Rome, 1939 Oct Vol. 2 No 5 pp 329-333 With 2 figs. English summary (3 lines)

The author records the presence of *Gl tachinoides palpalis fuscipes* and *pallidipes* in the district of Gambela on the confines of the Italian East Africa with the Anglo-Egyptian Sudan

LAVIER (G) & LEROUX (R) Lésions cardiaques dans la maladie du sommeil. [Cardiac Lesions in Sleeping Sickness].—*Bull Soc Path Exot* 1939 Dec. 13 Vol 32 No 10 pp 927-929 With 1 plate.

Notwithstanding the studies of Low and CASTELLANI of MOTT of THOMAS and BREINL and the more recent work of PERRUZZI on experimentally infected monkeys the lesions of the heart in sleeping sickness have not received the attention they merit. The authors have examined carefully sections of small pieces of cardiac tissue from two cases of sleeping sickness sent to them from the Belgian Congo.

Both cases showed typical and very pronounced epicarditis sclerotic endocarditis and periarterial myocarditis with arteritis of the branches of the coronary vessels. These changes are comparable with but much more pronounced than those found by Perruzzi in his infected monkeys. The fact that the lesions especially the intense myocardial

sclerosis found by the authors were more pronounced than those observed by Perruzzi is explained on the ground that the disease evolved much more slowly in the human cases. The authors consider that the lesions were so intense that the physiological function of the heart must have been seriously disturbed. IV Y

ROBIN (Ch) & BROCHEN (L.) Le diagnostic de la trypanosomie humaine par ponction de la moelle osseuse. Résultats et déductions pratiques de 60 ponctions sternales. [Diagnosis of Human Trypanosomiasis by Bone-Marrow Puncture.]—*Bull. Soc. Path. Exot.* 1939 Oct 11 Vol 32 No. 8 pp. 830-835

Reference is made to the fact that Robin and Jospin [this *Bulletin* 1937 Vol 34 p 928] had found that *T. gambiense* was constantly present in the bone-marrow of infected gumbags. They have now examined the point in human beings in various stages of sleeping sickness. The results of their observations are given in tables. Table 1 gives the result of examination of the gland juice, the spinal fluid and the bone-marrow in 9 early cases with normal spinal fluid. Table 2 gives similar data in 13 cases with meningeal reaction (slightly changed spinal fluid) and Table 3 the same in 28 late cases (with profound changes in the spinal fluid).

The general conclusions drawn are that, although the technique of sternal puncture is simple and painless and can be practised in the bush, yet its indications are limited because examination of the gland juice and blood gives a greater proportion of positive results than does bone-marrow puncture [see also GUINÉE this *Bulletin* 1939 Vol 35 p 704]. IV Y

CROZAFON (Charles) Le dépistage des trypanosomés en équipe de prospection. L'examen du sac ganglionnaire: état frais et suc coloré. [The Search for Cases of Sleeping Sickness by Travelling Missions. The Examination of Fresh and Stained Specimens of Gland Juice.]—*Ann. de Méd. et de Pharm. Colon.* 1939 July-Aug-Sept Vol 37 No. 3 pp. 742-746.

In a recent paper RAOULT has advocated the examination of stained smears of gland juice as a means of diagnosing trypanosomiasis in the bush [this *Bulletin* 1939 Vol 35 p 703]. The author has examined the method in the same sleeping sickness district as that in which Raoult worked, and abandoned it. He considers that the examination of fresh specimens of gland juice is, apart from that of triple centrifugation of blood, the best method of diagnosis. Examination of stained smears of gland juice has no advantages over the above procedure and merely adds to the labour of diagnosis and retards the work of the mission. IV Y

GEORGIADIS (D.) Contribution à l'étude de possibilités d'infection des méninges ou aggravation de la lymphocytose au cours des ponctions lombaires. [Contribution to the Study of the Possibility of Infecting the Meninges or of aggravating the Lymphocytosis by Lumbar Puncture.]—*Ann. Soc. Belge de Méd. Trop.* 1939 Dec 31 Vol 19 No. 4 pp. 533-537

The author set himself to inquire (1) whether the irritation of the meninges provoked by the introduction of the needle during lumbar

puncture caused an increase in the lymphocytosis or in the amount of globulin or of both (2) whether the haemorrhage resulting from damage to a vessel caused meningeal irritation or aggravated the condition and (3) whether trypanosomal invasion was possible or even frequent

The small number of observations made does not warrant conclusions. The patients were not sterilized with moranyl before puncture because this would invalidate the experiment at least in so far as the question of penetration of trypanosomes into the spinal fluid was concerned. The patients were allowed to rest 1 to 3 hours in the sun before puncture none of them was seriously verminous or suffered from grave dermatitis and all were free from yaws and syphilis

Details are given of 11 cases. Seven of these appeared to show that notwithstanding 2 or 3 lumbar punctures performed at short intervals a fatiguing journey exposure to the sun, and penetration of blood into the meninges the lymphocytosis and globulin content of the spinal fluid did not vary. On the contrary however 4 cases showed an increase in the lymphocytosis in one case the number of lymphocytes increased within 48 hours from 75 to 90. In 3 cases there seemed to be a significant increase in the lymphocytosis after the first puncture viz 4 to 12 4 to 10 and 15 to 30

IV Y

BRAZZAVILLE AFRIQUE EQUATORIALE FRANÇAISE RAPPORT SUR LE FONCTIONNEMENT DE L'INSTITUT PASTEUR DE BRAZZAVILLE PENDANT L'ANNÉE 1938 (SALEUN (G)) pp 69-83 —Service de la surveillance de la maladie du sommeil [Sleeping Sickness Service.]

During the year 624 European officials and 122 non-officials were examined but no instance of infection with trypanosomiasis was discovered this is the first occasion on which the Brazzaville Pasteur Institute has not been called upon to treat a new European case of sleeping sickness during an entire year. Six old European cases have been kept under observation in all the examinations of blood and spinal fluid were negative

Among the natives 164 new cases have been discovered and 967 old cases have been kept under observation. The methods of diagnosis employed were gland palpation and examination of gland juice examination of fresh coverslip preparations of blood and after triple centrifugation lumbar puncture and the formal-gel reaction. The results obtained from these various methods are shown in a table. It is noteworthy that in no fewer than 43 of the 164 cases diagnosis (discovery of trypanosomes) was made by lumbar puncture the other methods giving negative results. Of the 164 new cases 48 were in the early (blood-gland) stage and 116 showed changes in the cerebro-spinal fluid

Of the 44 patients in the early stage 41 have apparently been cured but 3 relapsed. Of 99 advanced patients 58 have done excellently in that the spinal fluid became normal in 37 the spinal fluid had improved three months after treatment but had not become normal and in 4 trypanosomes were still present in the peripheral circulation and the spinal fluid had not improved. In all 16 of the 164 new cases have died during the year. Two were moribund when discovered and died before treatment two first-stage cases died of intercurrent disease eight advanced cases died during treatment two advanced

cases seemed to improve but the disease subsequently developed rapidly and death resulted one advanced case was uninfluenced by treatment and one early case a child of 12 years died suddenly from an unknown cause after the second injection.

Details are then given of 18 old cases which died during 1939. The paper closes with a short discussion regarding the possible causes of the failure to cure in certain cases. Among these it is considered that the following play a part —

1 Drug-resistance of the parasite this cannot be ignored, but it is thought to account for failure to cure in only a very small number of patients

2 Site of the anatomical lesions the parasite may be buried in situations (bone-marrow internal organs, and especially in the nervous system) difficult of access to the medicament

3 Deficient defensive power of the body resulting from social conditions, poor food and intercurrent conditions

4 The non-utilization of the medicament By this the author apparently means the inability of the host to transform the medicament into a more highly trypanocidal substance. [Little or nothing is known of this matter beyond the conversion of the inert pentavalent aromatic arsenicals into the powerfully trypanocidal trivalent compounds]

5 A number of minor factors, which in themselves may appear trifling but in the aggregate may be important

LOUISE (E. M.) & YORKE (Warrington) Studies in Chemotherapy
XXI.—The Trypanocidal Action of Certain Aromatic Diamidines.—
Ann Trop Med & Parasit. 1939 Dec 30 Vol 33 Nos 3 & 4
pp 239-304

In collaboration with Dr EWINS of Messrs May and Baker the authors have continued their investigations on the trypanocidal action of the diamidines. The present paper records the results of examination of a long series of aromatic diamidines prepared by Dr Ewins. The authors summarize their results as follows —

In previous papers it was shown that certain guanidines, isothioureas, amides and amines with alkyl and alkylene chains exhibited considerable trypanocidal activity. As it seemed possible that the carbon chain merely served as a carrier of the active terminal groups of strong basic nature a number of aromatic amidino and guanidino compounds were prepared. They also were found to exhibit trypanocidal action.

Dr Ewins, of Messrs. May and Baker Ltd. with the object of developing this line of investigation, prepared a large number of aromatic compounds containing the amidino group and preliminary tests on mice showed that many of these compounds were powerfully trypanocidal.

The present investigation is concerned with a more extensive examination of the most active of these compounds. The most important, from the trypanocidal point of view were members of the series 4, 4'-R-O (CH₂)_n-O-R, where R is $\begin{smallmatrix} \text{NH}_2 \\ \diagup \\ \text{N} \end{smallmatrix} \text{C}_6\text{H}_4 \begin{smallmatrix} \diagdown \\ \text{NH}_2 \end{smallmatrix}$ and 4, 4'-R-CH=CH-R. Certain

members of the series 4, 4'-R-O(CH₂)_n-O-R, notably R-O(CH₂)₄-O-R (diamidino diphenoxy pentane) and R-O(CH₂)₆-O-R (diamidino diphenoxy propane) and 4, 4'-R-CH=CH-R (diamidino stilbene) exhibited a truly remarkable trypanocidal effect on mice infected with our laboratory strain of *T. rhodensis*. When administered intraperitoneally the maximum dose tolerated by mice is in each case about 1 mgm. per 20 gm. mouse. With the most active compound 4, 4'-R-CH=CH-R, such minute doses

as 0.005 and 0.00625 mgm. per 20 gm. mouse suffice to clear the peripheral blood of trypanosomes in more than 50 per cent. of cases permanent cures are obtained with doses of 0.01 and 0.0125 mgm. and with doses of 0.025 and 0.05 mgm. the great majority of animals are cured. The therapeutic index $\left(\frac{\text{Maximum tolerated dose}}{\text{Minimum curative dose}} \right)$ of 4,4'-diamidino stilbene is accordingly about 30. The other two compounds, viz. 4,4'-R-O(CH₂)₂, O-R and 4,4'-R-O(CH₂)₂,O-R, are only slightly less active. This degree of trypanocidal activity surpasses that of any of the aromatic arsenicals.

Tests on rabbits in an advanced stage of infection with the same trypanosome gave equally striking results. The maximum dose tolerated by rabbits when treated intravenously is about 20 mgm. per kilo. With 4,4'-R-CH-CH-R single doses of 1.25 to 5 mgm. per kilo cured the majority of animals and repeated small doses gave even better results. 0.5 mgm. (i.e. 1/40th of the maximum tolerated dose) repeated on each of 5 consecutive days curing all of 8 rabbits. The results obtained with the other two compounds are nearly as good.

While many of the compounds displayed some action on *T. congolensis* infections in mice cures were obtained only with 4,4'-R-CH-CH-R, and then only when the drug was given in maximum doses. All of 7 mice were cured by a single dose of 1.0 mgm. and 2 of 7 by a dose of 0.5 mgm. Repeated fractional doses gave better results, all of 9 mice being cured by 0.25 mgm. given on each of 3 consecutive days.

None of the compounds had any action on *T. cruzi* infections of mice nor on infections due to *Spirochaeta recurrentis* or *Spirillum minus*. Certain of them, however exhibit a remarkable activity against other protozoal infections, notably those due to *Leishmania* and *Babesia* but this will be discussed in subsequent papers.

Some description is given of the toxic manifestations exhibited by various animals and by man after the administration of relatively large doses of these aromatic diamidines. W. Y.

LOURIE (E. M.) & YORKE (Warrington) Studies in Chemotherapy
XXII.—The Action of Certain Aromatic Diamidines on *Babesia canis* Infections of Puppies.—*Ann Trop Med & Parasit* 1939
Dec 30 Vol 33 Nos 3 & 4 pp 305-312 [11 refs.]

Attention is drawn to the fact that very little progress in the therapy of *Babesia* infections has been made since NUTTALL's discovery in 1909 of the activity of trypan blue. STEPHAN and ESQUIBEL in 1929 showed that acriflavine also exerted a definite action on certain *Babesia* infections but the first real advance in the therapy of this group of diseases was made in 1935 when KIKUTHI and others published accounts of very successful results obtained with a Bayer product known as acaprin.

Several years ago Lourie and Yorke had noticed that certain aliphatic diamidines particularly n. undecane diamidine exerted a definite action in *Babesia canis* infections of puppies but that cures could not be obtained with this compound. This observation encouraged the authors to inquire whether the more powerfully trypanocidal aromatic diamidines had any action on *Babesia canis*. The present paper records the results of these experiments. The following summary is given—

1. Most of the aromatic diamidino compounds examined had a definite action on *Babesia canis* infections of puppies in that they caused the blood to become negative for a time.

2. The most active compounds were diamidino stilbene (R-CH-CH-R) diamidino diphenyl ether (R-O-R) and diamidino diphenoxy

propene ($R-O(CH_2)_5O-R$) Permanent cures could be obtained with single doses of these substances or with two smaller doses given on successive days.

3 *Babesia canis* could readily be made resistant to these aromatic diamidines, and the drug-resistance persisted unchanged after passage of the parasite through a number of puppies " 11 "

DE BOSCHGRAVE (Osc.) Trypanocide werking "in vitro" van Argoflavine en Atebrine [Trypanocidal Activity of Argoflavine and Atebrine *in vitro*]—*Ann Soc Belge de Méd Trop* 1939 Dec 31 Vol 19 No 4 pp 489-493 French summary

The author summarizes his paper as follows —

Although Argoflavine and Atebrine show practically no clinical activity in trypanosomiasis, we have established that Argoflavine in the case of an ordinary strain and of an arsenic-resistant strain of *T. gambiense* and Atebrine in the case of the latter strain, remove *in vitro* almost instantaneously the power of blood rich in trypanosomes to infect guinea-pigs, provided that the concentration of the drugs reaches 2 per 1000. The arsenic-resistant strain is twice as sensitive to Argoflavine as the normal strain; the former becomes avirulent after 20 minutes at a concentration of 1 in 30 000 the latter in the same period only at 1 in 15,000 " C IV

DE BOSCHGRAVE (Osc.) Photodynamie van "Argoflavine" voor *Trypanosoma gambiense* [Photodynamic Action of Argoflavine on *T. gambiense*]—*Ann Soc Belge de Méd Trop* 1939 Dec 31 Vol 19 No 4 pp 495-500 French summary

The author summarizes his paper as follows —

1 Under the action of the intense beam of an ordinary arc lamp for dark ground illumination, Argoflavine destroys the motility of *T. gambiense* about ten times more quickly than by diffuse daylight

2 This photodynamic action was more intense with an arsenic-resistant strain than with a normal strain. (At the same time the arsenic-resistant strain was more sensitive than the normal strain to non-irradiated Argoflavine see above. It should be understood that the difference in sensitivity is not necessarily in proportion to the arsenic-resistance since the normal strain has been isolated in a guinea-pig only one year and the arsenic-resistant strain 6 years.)

3 We have not been able to confirm the phenomenon of the rapid disappearance of the blepharoplast under the influence of acridine derivatives, which has been reported by JACOBO and KOLLE *et al*

4 The photodynamic effect may be the result not only of the activation of trypanocidal power of the drug but also of the diminution of resistance of the parasite to light " C IV

- i. COO. (Arthur B.) Nitritoid Cases following Trypanamide Therapy—*Arch Dermat & Syph* 1939 Oct Vol 40 No 4 pp 601-602
- ii. ELLIS (Francis A.) Nitritoid Reactions due to Trypanamide. Report of a Case—*Ibid* 1939 Nov Vol 40 No 5 pp 707-708

1 Coon reports two nitritoid reactions developing in a syphilitic during the course of trypanamide treatment. The patient contracted syphilis in 1925 for which he had irregular and inadequate treatment. In 1936 he consulted the author with signs of neurosyphilis, for which

he received vigorous, uninterrupted antisyphilitic treatment with bismuth iodides arsphenamine and tryparsamide. By September 1937 he had had 39 injections of tryparsamide and as lumbar puncture still showed a pathological spinal fluid the patient was treated with malaria. Tryparsamide treatment was resumed in January 1938 at which time the patient had greatly improved.

After the tenth injection of this course the patient felt weak, faint and nauseated, the pulse was accelerated and marked congestion of the conjunctiva, face and neck supervened. He soon recovered and tryparsamide was withheld for five months. No untoward reaction followed the subsequent course of tryparsamide until the ninth injection (58th of the series 167 gm.) when there occurred immediate extreme congestion of the conjunctiva, face and neck, acceleration of the pulse and respiration, depression, nausea, desire to defaecate and itching of the face, neck, trunk and arms. After 30 minutes rest the patient recovered sufficiently to return home. The next day he reported that he had had a rigor, weakness, nausea and a desire to defaecate. The rigor which lasted 90 minutes was followed by a high temperature of several hours duration, prostration and numerous weals on the chest, abdomen and arms. The next morning the condition had returned to normal.

ii. Ellis records a somewhat similar reaction in a neuro-syphilitic who was given malaria treatment in 1933 and between February 1934 and March 1939 had no fewer than 148 injections of tryparsamide of 3 gm. each. Only after the 113th injection did the patient experience mild vasomotor reactions characterized by flushing of the face and neck. After subsequent treatment the symptoms became more severe and there was a constricted feeling in the chest accompanied by a cough and throbbing of the head. The more severe reactions lasted 30 to 45 minutes.

After the last injection of tryparsamide (2 gm.) there was definite flushing of the face, the patient had a sense of impending disaster and a tight feeling in the chest. In ten minutes he began to cough and vomit. Soon there developed severe cramps in the abdomen and these were followed by involuntary movements of the bowel and bladder. In 30 minutes the symptoms began to abate. The blood pressure and pulse varied but slightly during the attack. IV Y

CULBERTSON (James T.) & WOTTON (Robert M.) Studies on Age Resistance against Trypanosome Infections. VI. Production of Abblastin in Rats of Different Age Groups after Infection with *Trypanosoma lewisi*.—*Amer J Hyg* 1939 Nov Vol. 30 No 3 Sect C. pp 101-113 With 2 graphs. [14 refs]

This paper records the results of a study comparing the production of abblastin [an antibody inhibiting trypanosome reproduction *vide* this Bulletin 1933 Vol. 30 p 122 and 1939 Vol. 36 p 214] in rats of different age groups following infection with *T. lewisi*. According to TALIAFERRO this antibody is an important factor in the resistance of the adult rat to infection with *T. lewisi*. It appears in the serum about the fourth or fifth day after infection and gradually increases in amount in the blood until the host is cleared of the infection. It persists in the blood of recovered animals and seems to account for the lifelong immunity to re-infection which recovered rats enjoy.

In the experiments described in the present paper rats of different age groups have been carefully tested for their capacity to produce ablastin. The following are the conclusions —

"Rats 25 days of age or more, when infected with *Trypanosoma lewisi* generally produce the ablastin antibody well and usually survive the infection. Rats below this age, when infected, generally produce the ablastin antibody poorly or not at all and usually succumb to *Trypanosoma lewisi* infection.

"Although other factors also doubtless play a significant rôle in the acquisition of resistance with age it is concluded that the greater capacity of the older rat to form the ablastin antibody is a major factor in the greater resistance of older rats to infection with *Trypanosoma lewisi*.

W 1

KOLODNY (Maxwell H.) Studies on Age Resistance against Trypanosome Infections. VII. The Influence of Age upon the Immunological Response of Rats to Infection with *Trypanosoma cruzi* — *Amer J Hyg* 1940 Jan. Vol. 31 No. 1 Sect. C. pp. 1-8. With 1 fig. (11 refs.)

CULBERTSON and WOTROX [see above] have described the immunological response of rats of different ages to an active infection with *T. lewisi* and have shown that the capacity of rats to produce ablastin antibody increases with age. It was pointed out that this antibody is seriously deficient in nurslings and that these animals usually succumb to the infection. Kolodny has investigated the point in *T. cruzi* infections of rats of different ages. He summarizes his conclusions as follows —

"The capacity of rats to produce an immune response after infection with *T. cruzi* is influenced by the age of the animal at the time of its infection.

Young suckling rats up to 20 days of age are unable to respond to this infection at any time before their death with the production of a sufficient quantity of protective antibodies to be demonstrable by the protection-test method.

"Recently weaned rats, 30 days of age at infection, produce antibodies that are first demonstrable about 15 days following infection. In these animals the antibody titer increases progressively and about 35 days after infection attains a maximum which is definitely lower than that reached by older animals.

"Young adult rats 60 days of age and fully mature rats 85 days to 100 days of age produce antibodies that are first demonstrable about 8 days after infection. Thereafter the antibody titer increases progressively but somewhat more rapidly in the fully mature rats. The final antibody titer 35 days after infection is, for all practical purposes, the same in animals of both age groups.

The inability of nursing rats to develop demonstrable quantities of protective circulating antibodies, and the gradual perfection with age of this immunological response substantiates the previously reported observations on the functional immaturity of the antibody-forming mechanisms of very young animals. Development of these protective antibodies appears to be one of the important defense mechanisms of the host inasmuch as recovery as a rule follows the appearance of these immune bodies.

"The period of maximum immunological activity occurs concomitantly with the onset of physiological maturity."

W 1

CULBERTSON (James T) The Natural Transmission of Immunity against *Trypanosoma duttoni* from Mother Mice to their Young — *Jl Immunology* 1940 Jan Vol. 38 No 1 pp 51-68. [14 refs]

It is now established upon a sound basis that immune mothers do confer resistance to their young against specific infections and in some cases the survival of the young is contingent upon the transfer of protective substances to them from the mother. This might occur either through the placental circulation or through the milk. Evidence has been accumulated which indicates that different species of animals differ fundamentally as to which of these two possible routes of transmission of protective substances is the principal one.

Previous work by the author and KOLODNY has shown that in the case of *T. lewisi* and *T. cruzi* infections of rats the transfer of antibody from the mother to the young was attained by the young almost entirely through the ingestion of the mother's milk. [This *Bulletin* 1939 Vol. 36 p 751 and 1940 Vol. 37 p 143]

The present paper records the results of a similar study carried out in the mouse with a natural mouse parasite *T. duttoni*. The author summarizes his results as follows —

Mother mice which have recovered from an infection with *Tryp. duttoni* transmit to their young protective substances which render the young resistant to infection with this parasite. The young animals acquire their resistance principally after birth through the ingestion of milk from the immune mother. The young born of a normal mother promptly acquire resistance against *Tryp. duttoni* if permitted to nurse the specifically immune mother.

The immune substances are secreted by the mother not only in the colostrum but also in the milk later passed, and nurslings until 16 days old as well as those newly born can absorb the protective substances from the intestine after ingesting the milk of the immune mother. Accordingly it is possible for a mother who has been infected after the birth of her litter to develop and transmit protective substances to her nurslings in sufficient amount to protect them measurably against a subsequent infection.

A mother mouse passively immunized by the injection of serum from a mouse which has recovered from *Tryp. duttoni* is also able to transmit protective substances to the young which nurse her.

The immunity of the young mice is specific, and nurslings injected with *Tryp. cruzi* will become infected even though they nurse a mother immune to *Tryp. duttoni*.

It is pointed out, in discussion, that the mouse differs as to the principal route of transfer of the protective substances to the young from that generally accepted for hemochorial mammals. IV Y

ACANFORA (Giuseppe) Tentativi di infezione sperimentale dell'embrione di pollo con *Castellanella brucei* [Experimental Infection of Fowl Embryo with *T. brucei*] — *Arch Ital Sci Med Colon e Parassit* 1939 Oct Vol. 20 No 10 pp. 577-591 With 2 charts & 7 figs.

The author shows that it is possible to infect the blood of fowl embryo with *T. brucei* and that multiplication may take place though only 5 per cent of the attempts are successful and only if the inoculation is made between the 8th and 14th days of incubation. The trypanosomes multiply rapidly for 3 to 4 days proportionately to the number

injected, then the number remains stationary for about 48 hours and after that the trypanosomes disappear suddenly and completely. The embryo does not always die and in some cases the parasites undergo a degenerative process before disappearing from the circulation.

C IV

BIOCCA (E.) Essais de vaccination contre le *T. brucei* chez les cobayes moyennant une bouillie d'embryon de poulet infecté conservée en glacière [Attempts to vaccinate Guinea Pigs against *T. brucei* by Means of Emulsions of Infected Chick Embryo preserved on Ice.]—*Boll. Società Ital. Soc. Internaz. di Microbiologia* Milan. 1939 May-June. Vol 11 No 5-6 pp 138-137

In the experiments recorded in this paper the author has inquired whether a suspension of chick embryo 13 to 16 days after infection with *T. brucei* preserved for various periods on ice and then inoculated intraperitoneally into guinea pigs, would increase the resistance of the guinea pigs to subsequent infection with *T. brucei*.

It was found that 0.1 cc. of suspension kept for 3 to 5 days on ice increased the resistance of the guinea pigs in so far as it prolonged the course of the disease when they were subsequently inoculated with *T. brucei*. In 9 control observations the animals died in from 6 to 13 days, whereas the 7 vaccinated animals lived for 33 to 59 days.

IV Y

VAN DEN BRANDEN (F.) Le sang des lapins infectés de trypanosoma Brucei renferme-t-il des réagines de Wassermann et possède-t-il des propriétés flocculantes? [Does the Blood of Rabbits Infected with *T. brucei* give a Positive Wassermann Reaction and does it exhibit Flocculating Properties?]—*Ann. Soc. Belges de Méd. Trop.* 1939 Dec 31 Vol 19 No 4 pp. 595-600

Reference is made to the fact that LANDSTEDER and VAN DER SCHEER (1927) obtained complement fixation and a positive flocculation (Sachs-Georgi) reaction with the blood of rabbits experimentally infected with *T. equiperdum* and also with that of rabbits inoculated intravenously with dead trypanosomes.

As van den Branden had at his disposal rabbits infected many months with *T. brucei* he decided to examine the complement fixation reaction—he used as antigen an alcoholic extract of *T. brucei* and also an alcoholic extract of calf's heart.

It was found that with the normal rabbit the complement fixation reaction was negative whichever antigen was employed, whereas with the infected rabbits the reaction was positive with the trypanosome antigen and negative with the heart antigen. The flocculation test (Kalin) was positive in 38 per cent of normal animals and in 41.6 per cent. of infected animals.

IV Y

DUBOIS (A.) & KORN (I.) A propos du mode d'action de l'arséno-benzène sur les trypanosomes. [The Mode of Action of Arsenobenzol on Trypanosomes.]—*Ann. Soc. Belges de Méd. Trop.* 1939 Dec 31 Vol 19 No. 4 pp 501-512 [11 refs.]

In this article the authors have refrained from a discussion of the vast subject of the mode of action of therapeutic substances, but

limit themselves to a consideration of the mechanism of action of arsenobenzol on *T. brucei*. It is generally admitted that the mode of action of this substance is direct since YORKE and MURGATROYD [this *Bulletin* 1931 Vol 28 p 350] demonstrated that it killed trypanosomes *in vitro* in great dilutions.

Dubois and Kohn have confirmed this conclusion by a simple technique which consisted briefly in injecting a heavily infected mouse with a large dose of 914 intravenously and then after various intervals (5 to 20 minutes) inoculating healthy mice with the blood of the infected and treated mouse. It was found for example that only 5 minutes after the treatment (4.5 or 3 mgm. of arsenobenzol) of a heavily infected mouse its trypanosomes were no longer infective when injected into normal mice. The trypanosomes had consequently fixed a fatal dose of the drug within a very short period, so that any question of the intervention of the defence forces of the organism can be excluded.

The problem whether 914 acts as such or after transformation (into arsenoxide) in the body of the host is however still unsettled. The action of 914 is moderately rapid whilst that of arsenoxide or of the products of oxidation of arsenobenzol is much more rapid. This fact which the authors have confirmed seems rather to favour a transformation.

The authors were able to discover little difference between the rapidity of action of 914 when administered intravenously and when given subcutaneously. There is however no doubt that the compound is much more toxic when given by the latter route and this suggests that it undergoes chemical change when given subcutaneously nevertheless the rapidity of sterilization and the efficacy are not materially increased.

The action of 914 was found to be retarded by methylene blue. This can be interpreted as due to an inhibition of its oxidation but it must be confessed that the existence of toxic phenomena makes the interpretation difficult and that a redox system such as ascorbic acid is apparently much less active.

The non infectivity of trypanosomes some minutes after treatment of the infected animal does not seem to favour the necessity of oxidation of 914 but of course the compound may be oxidized inside the body of the parasite.

IV Y

DUBOIS (A) & LOSNER (S) L'élimination de l'arsénobenzène chez les animaux normaux et à système réticulo-endothélial bloqué [The Elimination of Arsenobenzol in the Normal Animal and in Animals in which the Reticulo-Endothelium is Blocked.]—*Ann. Soc. Belge de Méd. Trop.* 1939 Dec. 31 Vol 19 No 4 pp 513-525 With 1 chart

Details are given of 11 experiments in which estimations of arsenic in the blood were made in rabbits and rats at intervals after the administration of 914. In certain of these experimental animals the reticulo-endothelium was blocked by splenectomy combined with intravenous injection of Chinese ink or electro-colloidal copper. The technique used for estimation of the arsenic content of the blood was that of Beck and Merres it is described in some detail.

The results obtained showed that arsenic could be found up to 24 hours in traces sufficient to explain trypanocidal action. The

GASIC (Gabriel) Índice de infestación por *Trypanosoma cruzi* de los Triatomídeos de la provincia de Coquimbo. [Degree of Infestation of Triatoma by *T. cruzi* in the Province of Coquimbo.]—*Rev Chilena de Hig y Med Preventiva* 1939 Jan.-Mar Vol 2 No 1-3 pp. 17-20.

Specimens of *Triatoma infestans* in three districts of the Province were examined. In Illapel of 288 captured 158 (54 per cent.) were infected—124 of 179 adults and 34 of 109 larvae or nymphs. In Ovalle 102 of 167 adults (60 per cent.) and 72 of 184 larvae and nymphs (39 per cent.) or together 174 out of 351 (49 per cent.) In Elqui department 185 were positive out of 364 (50 per cent.) 113 out of 188 adults (60) and 72 out of 178 larvae and nymphs (40 per cent.) It was at Paituana in this department that the first acute case of Chagas's disease in Chile was reported. In the Province, therefore from examination of 534 adults and 469 larval stages, or 1,003 in all 517 or 51 per cent. were found infected. H H S

HOFFMAN (W. H.) Experiencias biológicas sobre los triatomas de Cuba [On Cuban Triatomata.]—*Rev Med Trop y Parasit Habana*, 1939 Sept.-Oct. Vol. 5 No 5 pp 267-272.

The author describes the *Triatoma flavida* a Reduviid found, he states, only in Cuba and even there restricted to certain districts Oriente, Camagüey and the mountainous parts of Pinar del Rio. It is the largest of the Cuban Reduviids [the author gives its length as 24-39 cm truly a formidable "whale of a bug" (he probably means mm)] is a blood-sucker and experimentally acts as a vector of *T. cruzi*. Examination of many specimens caught has not yet revealed any naturally infected with trypanosomes but should a patient be introduced into the island, the risk of the disease obtaining a hold is great seeing that the potential vector already exists.

The author calls for further study to determine more accurately the distribution of *Triatoma flavida* and for vigilance against admission of patients harbouring *T. cruzi*. H H S

MAZZA (Salvador) BASSO (Germinal) BASSO (Redento) & JONG (Miguel Eduardo) Investigaciones sobre la enfermedad de Chagas. I. Primer caso mortal de forma crónica cardíaca de enfermedad de Chagas, comprobado en Mendoza. [Chagas's Disease. I. First Fatal Case of the Chronic Cardiac Form seen in Mendoza.]—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Juvry) Publicación No 43* 1939 pp 1-73 With 83 figs & 1 coloured plate [10 refs.]

This is a very detailed account of the pathological anatomy and histology of the lesions found in a woman of 21 years with microcephaly enlarged thyroid, absence of the left hand and other congenital deformities who suffered from certain heart symptoms, asthma, etc. and died 18 months after the beginning of her cardiac symptoms. The article is purely of pathological interest and the descriptions of the changes found cannot be summarized. It is illustrated by three photographs, three teleradiographs, more than a score of electrocardiograms, a coloured plate and 70 photomicrographs. H H S

MAZZA (Salvador) & JÖRG (Miguel Eduardo) Investigaciones sobre la enfermedad de Chagas II Diferencias entre anatomía patológica de carditis reumática y carditis de enfermedad de Chagas. [Chagas's Disease. II. The Cardiac Lesions of Chagas's Disease compared with those due to Rheumatism.]—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) Publicación No 42* 1939 pp 74-97 With 12 figs. [24 refs.]

This like the last deals solely as the title implies with morbid histology the differences which in some respects are questions of degree are described in detail in the text and the fundamental qualitative differences are presented in a table under the headings of (1) Exudative and katabiotic changes (2) Bioplastic phenomena re-absorption proliferation and cellular differences (3) Evolution leading in the rheumatic form to nodular sclerotic scars and in some cases to larger sclerotic areas multifocal and perivascular in Chagas's disease to diffuse sclerosis with slender collagen fibrilla with necrobiotic foci and irregularly distributed giant cells in zones of infiltration with myeloid and eosinophil cells. H H S

ALBERTO AGUIRRE (Juan) & GIMENEZ (Clodomiro) Consideraciones de semiología radiológica sobre 168 roentgenocardiometrías en la enfermedad de Chagas [Radiology of the Heart in Chagas's Disease]—Reprinted from *Las Actas y Trabajos del VI Congreso Nacional de Medicina Córdoba* 1939 Vol. 3 7 pp

Though this article analyses 168 radiograms only 61 patients were examined ranging in age from 3 to 64 years but 54 of them were below 14 years All but 7 showed recognizable changes by X ray enlargement of both ventricles more particularly the left this enlargement progressed with the disease and might reach double the normal size but diminished again under treatment particularly with rest and digitals. In some cases there were periodic enlargements of more sudden onset as if the heart were undergoing acute dilatation ascribable to myopathy H H S

MAZZA (Salvador) Métodos de investigación de la epidemiología de la enfermedad de Chagas. La viscerotomía cardio-hepática. [The Viscerotomy as an Aid in studying the Prevalence of Chagas's Disease]—*Prensa Méd Argentina* 1939 Dec 20 Vol. 26 No. 51 pp 2461-2470 [22 refs.]

After discussing the value of xenodiagnostic methods and of the Machado-Guerreiro reaction in the diagnosis of Chagas's disease the author describes certain changes in the liver which he regards as pathognomonic of this disease These are nodular formations mostly in the middle of the lobules made up of accumulated lymphocytes in a thick network of reticular histiocytes which dissociate the tissue and appear on section as circular foci. This nodular hepatitis with proliferation of histiocytes in an indurated passively congested liver is he states of diagnostic importance In the same way as the viscerotomy has proved its value in the epidemiology of yellow fever so it is as regards Chagas's disease by enabling sections to be made of the liver tissue to demonstrate characteristic pathological changes. At the same time as the liver tissue is taken the opportunity may be seized

affected with plague which it may transmit directly to man or much more commonly to the black rat. MEYER (p 424) points out the superiority of the investigation of pools of fleas, lice and ticks over the examination of rodents in the investigation of sylvatic plague.

MACCARIAVELLO (p 424) considers that the rat is the principal reservoir of plague in Chile in the inter-epidemic periods, but that the recurrence in cycles of acute epidemics is due to reintroduction of infected fleas in bales of jute from India.

He (p 425) discusses the pathology of rat plague.

ROSENA (p 425) gives figures showing the decline of plague in Java during 1938. The death rate remains very high. Vaccination with Otten's living vaccine was energetically carried out and in the housing campaign 54 548 new houses were built. SOUWORO (p 426) describes the voluntary house improvement campaign in the district of Madja in Java. No compulsion other than official propaganda is employed but by March 1938 89-92 per cent of the houses had been improved by the owners. The district is exceptional in its wealth but the author points out that the total disappearance of plague may be an inducement to other districts to follow this example.

SAVINO and AYCELIAR (p 426) discuss vaccination with the E.V. and the Tjwidj strains: the former which gives rise to granulations in the spleen of animals inoculated is superior to the latter in immunizing power.

SORIKY *et al* (p 427) state that fumigation with HCN has always been the most effective method of dealing with rats and fleas but is dangerous. They comment favourably on calced briquettes as a satisfactory means of applying the gas.

YOKOTAMA (p 427) discusses the infectivity of various *Salmonella* for rodents.

DAKKEI (p 427) states that red Scilla has almost a selective action against the rat.

C IV

RAO (S. Raghavender) *Studies in the Epidemiology of Plague in H. E. H. the Nizam's Dominions. Comparison of Certain Factors in a Plague-Infected Place with that of Neighbouring Plague-free Area.*—*Indian Med Gaz* 1940 Feb Vol 75 No 2 pp 80-86. With 1 map & 1 fig.

The immunity from plague of various parts of India and especially its entire East Coast Eastern Bengal and Assam has been the subject of much discussion. It occurred to the author that he could get, within the limits of the Nizam's Dominions, two adjacent areas one plague-infected and the other plague-free which might afford an opportunity to determine the cause of a marked immunity from plague. The two areas were Hyderabad City and Nalgonda town, the former liable to attack every year and the latter free except for imported cases. The rat population, *R. rattus* was practically the same in both cases but the fleas of Hyderabad were *X. cheopis* and those of Nalgonda were *X. astia*. Both these fleas are capable experimentally of transmitting plague but *X. astia* is a notoriously inefficient vector and this inefficiency may be ascribed to its great susceptibility to adverse climatic conditions. There was some indication that the rats of Hyderabad were rather more resistant to plague infection than the Nalgonda rats, but the difference was not of the order which distinguishes the Bombay rat from the Madras rat. Free communication

exists between Nalgonda and the neighbouring infected places but Nalgonda has a hot dry climate. These factors of high temperature and low humidity acting on so susceptible a flea as *X. astia* probably explain why Nalgonda has escaped the annual epidemics of Hyderabad.

W F Harvey

CONGO BELGE RAPPORT SUR L'HYGIÈNE PUBLIQUE AU CONGO BELGE PENDANT L'ANNEE 1938 [VAN HOOF (L.)]—[Plague pp 17-19]

A total of 19 cases of plague with 17 deaths was discovered in the region of Butembo to the west of Lake Edward. Sulphanilamide therapy gave two cures in three cases tried. An examination showed that the human flea is *Ctenocephalus* and although this flea is regarded as a bad vector two strains of the plague bacillus were isolated from it. Moreover other strains were obtained from fleas of this species caught in the dust of native huts. Altogether 31 strains of plague were isolated from fleas of various species (*X. brasiliensis* *Ctenocephalus canis* *Sarcopsylla* *Ctenophthalmus* *X. cheopis*) 25 from rodents (*Mastomys*, *Leggadia*, *Agricantthis*, *Lemiscornys*, *Lophuromys* and an unknown species) and 18 from man. Most of the prophylactic vaccination has been carried out with dead vaccine as the use of living vaccine (E.V.) is still regarded as being on its trial. It is suggested that the limited extent of plague in this new focus may be due to the absence of *X. cheopis*.

W F H

VAN RIEL (J) & MOL (G) La peste dans le nord du Kivu. [Plague in the North of Kivu.]—*Ann Soc Belge de Méd Trop* 1939 Sept 30 Vol. 19 No 3 pp 453-472. With 3 maps. [28 refs.]

Lake Kivu is in Belgian Congo and on the borders of British territory. To the west is Lake Victoria and to the north west Uganda.

The focus of plague discovered in 1897 by KOCH and ZUPITZA around Lake Victoria may represent perhaps the last trace of the disease from which the pandemics of ancient Egypt took their origin. This is to describe the plague of this region as a primary old standing focus of antiquity and this view is further elaborated by the authors for modern times when they say: Periodically in Uganda and the neighbouring territories of Kenya and Tanganyika this focus shows renewed activity and becomes the place of origin of a devastating epidemic. The present work contains a general discussion of plague epidemiology with topographical detail and may be summarized in its main points: (1) A new focus of human and rat plague has been discovered in Belgian Congo in the territories of Lubero and Beni. (2) Twenty strains of the plague bacillus were isolated by the collective method of inoculation of bone marrow of rats into guinea-pigs. *Mastomys ugandae* and *Rattus rattus alexandrinus* are carriers of plague and *Xenopsylla brasiliensis* is a vector. (3) This focus of plague belongs to the endemic group of East Africa probably by way of the Ituri Kivu route.

W F H

DE OLIVEIRA (Waldomiro) A epidemiologia e profilaxia da peste no estado de São Paulo. [Plague Epidemiology and Prophylaxis in São Paulo.]—*Bol Oficina Sanitaria Panamericana* 1939 Dec Vol. 18. No 12. pp 1138-1150. With 1 fig & 2 charts.

This article concerns itself mainly with the activity of the Department of Health which was represented at the Brazilian Conference

on the Epidemiology of Plague in 1938. It discusses sylvatic plague laboratory measures, urban and rural prophylaxis and recommends a unified organization, legally established and similar to that in Peru.

W F H

WATS (R. C.) WAGLE (P. M.) & PUDUVAL (T. K.) A Serological Study of Some Strains of *Pasteurella pestis*—*Indian Jl Med Res.* 1939 Oct Vol 27 No. 2 pp 373-387 [12 refs]

Most of the attempts hitherto made to show the existence of serologically different strains of *P. pestis* have failed. Nor has the present attempt been any more successful except in the case of a strain from China. Some of the difficulties, however of obtaining sera and suspensions for carrying out the technique have been overcome and certain differences in reaction of the organisms revealed according as cultures were incubated at 23°C or 37°C. Sera were obtained by inoculating rabbits first subcutaneously and later intravenously with graduated doses of heat killed (55°C for 30 minutes) cultures of *P. pestis* grown at room temperature (27°C to 29°C) on "acid digest agar" and suspended in normal saline. The preparation of an agglutinable suspension of the bacilli which when grown at room temperature are salt and serum sensitive is complicated. A procedure was adopted for bacilli grown at 27°C and 37°C respectively which is designed, by shaking sedimenting and centrifuging to obtain a homogeneous fine suspension. Although serological differences in strains could not be detected a distinct difference was manifest in the type of agglutination obtained when the bacillus was grown at room temperature or 37°C. In the former case agglutination was slow flakes were small and sediment compact, in the latter rapid, large and voluminous. The incubator (37°C) growth is capable of absorbing all agglutinins from the sera obtained by immunizing animals with incubator or room-temperature growths, whereas the room-temperature growth is only capable of removing the antibodies from a serum produced by immunizing animals with room-temperature growth. The incubator (37°C) growth when heated at 100°C. for one hour behaves more or less like a room-temperature growth.

W F H

SOAHEY (S. S.) Experimental Studies in Plague. Part I. Introduction.—*Indian Jl Med Res* 1939 Oct Vol 27 No. 2 pp 313-319 [27 refs] Part II. The Solid Medium of Choice, and the Optimal Temperature of Incubation, for the Growth of the Plague Bacillus.—*Ibid.* pp 321-329 With 4 plates [18 refs.] Part III. A Method for determining the Number of Viable Plague Organisms in Broth Cultures.—*Ibid.* pp 331-340 Part IV. Experimental Animal of Choice for Plague Work.—*Ibid.* pp 341-354 With 4 figs on 2 plates. Part V. A Method for measuring the Virulence of Plague Cultures.—*Ibid.* pp 355-361 Part VI. A Method for maintaining the Virulence of *Pasteurella pestis*—*Ibid.* pp 363-371 [22 refs]

I. In this introduction to a series of articles on plague a critical survey is made of the procedure employed in preparation of vaccine from earliest times to the present day. Criticism is directed not only

to technique but also to the absence of satisfactory statistical assessment of results. It seems the main difficulty of previous workers was due to the lack of a constant test infective dose constant both as regards virulence and number of organisms.

Many points that are essential in regard to the vaccine have not been determined or the determination has been faulty. The present studies relate to some of these points.

II Although the plague bacillus will grow on ordinary nutrient agar this is not the optimum nor even a suitable medium as may be shown by attempting to obtain growth from a high dilution of a 48-hour broth culture. With a 1-1 000 dilution no growth is obtainable by planting on ordinary agar and incubating for 48 hours at 27°C whereas blood agar medium showed discrete colonies. This fact was turned to good account not only to obtain a count of bacteria per cc but also for detecting contamination in a brew. Optimum temperatures for growth were determined by plating out on nutrient agar progressive tenth dilutions of a 48-hour broth culture and incubating at 27°C and 37°C respectively. With a 27°C incubation about 5 000 organisms per sq. cm. must be planted to get any growth at all but when the plates are incubated at 37.5°C seeding of 500 organisms is enough to give growth. In the author's summary of the position it is said that the addition of defibrinated blood, serum, copper sulphate and sodium sulphite promotes the growth of sparsely seeded *P. pestis* on agar surfaces and that in the case of a solid medium the medium of choice is blood agar and the optimal temperature of incubation 37°C a temperature very unfavourable for the growth of this organism in a liquid medium.

III The method of counting viable organisms by the number of colonies they produce has been developed and consists in making progressive tenth dilutions of the bacterial suspension planting 0.05 cc of a suitable dilution on 40 sq. cm. of blood agar and incubating at 37.5°C. That dilution is preferred for enumeration which gives 10 to 40 discrete colonies. Counts thus made agree closely with results obtained by direct microscopic count or the biological response of a highly susceptible animal to infection. Other standard conditions are imposed such as the use of equal quantities of the same nutrient broth, the same amount of inoculum, test tube of the same internal diameter, a strictly vertical position in the incubator and a strictly undisturbed state in the incubator.

IV With the methods of counting the content in bacteria of 48-hour broth cultures described it has become possible to devise a constant infective test dose. The less constant dose provided by a splenic suspension dose has therefore been superseded. White mice of an inbred strain provide specific constant and highly susceptible test animals. About 10 organisms per animal produce a 100 per cent mortality in the white mouse whereas 900 to 85 000 organisms were needed in the case of the wild house rat, 40 to 8 500 organisms for the white rat and 6 to over 15 million organisms in the case of the guinea pig. As the breeding of white mice under tropical climatic conditions is not altogether simple an appendix is supplied on the

Breeding and Care of the White Mouse

V Measurement of virulence means the determination of the smallest number of organisms which when given subcutaneously in doses of 0.2 cc. of a dilution of a 48-hour broth culture incubated at 25° to 27°C to a batch of inbred white mice will kill approximately

europanus. It is considered probable that here as elsewhere the original infection of the wild rodents came from the domestic rat and that epizootics in the former slumber on, after subsidence, as enzootics. The fleas of these rodents *Parapsyllus* and *Rhopalopsyllus* have been shown capable of transmitting plague to man W F H

BOLETIN SANITARIO Buenos Aires. 1939 May Vol. 3 No 5 pp. 405-416 With 4 figs.—Sesion de la Comision de Asesoramiento Tecnico de la Peste [Meeting of the Plague Technical Council.]

An outbreak of human plague in the Argentine province of Salta led to the discovery of extensive sylvatic plague in the Argentine-Bolivian frontier. The rodent concerned was of the genus *Sylvilagus*. Among some of the sparse populations affected it is difficult, for geographical reasons, to ascribe the entire rôle of development of human plague to an epizootic among rats. There is no doubt, however, that the domestic rat is a major factor contracting plague through its habit of feeding on dead animals (necrophagy) at the outskirts of human habitations. The mortality among wild rodents in the case of the present epidemic had been observed and the rat gets its plague and renews its epizootics from the former. But man may get plague directly although seldom, from the wild rodent. Thus both man and the rat represent test animals, in these districts, of the existence of sylvatic plague W F H

MEYER (Karl F.) Sylvatic Plague.—*Amer J Public Health* 1939 Nov Vol. 29 No 11 pp 1225-1230

This publication is by the Chairman of the Sylvatic Plague Committee of the Western Branch American Public Health Association and is the fourth report. A previous report has already been noticed [this *Bulletin* 1938 Vol 35 p 201]. New States and new countries are added to those previously reported as showing plague infection of wild rodents. The new States are Wyoming and New Mexico, as given in a table recording observations up to June 30th, 1939. Once more it is observed that "the collection and inoculation of gumespags with pools of fleas, lice and ticks has again yielded more information than the examination of the carcasses of rodents shot or trapped." The opening statement of the report is that "The Executive Committee has held no meetings. No problems were submitted for consideration. In fact, it is apparent that without further more accurate knowledge relative to the epidemiology of plague infection in rodents, no more significant and effective suppressive measures than those in use can be devised."

W F H

MACCHIAVELLO (Atilio) Estudios sobre peste bubonica. I.—Epidemiología de la peste Chilena. [Epidemiology of Plague in Chile].—*Rev Chilena de Hig y Med Preventiva* 1937 Jan-Dec Vol 1 No 1 pp. 68-87 [67 refs.]

Rat plague has existed in Chile from 1903 to 1932 and the last human epidemic took place in 1930. An analysis of epidemics of past years shows that once started, an epidemic flares up and is followed in succeeding years by epidemics of less and less intensity until, in

some localities there is complete disappearance. The epidemic however in its acute form reappears again and the same subsequent annual decrease takes place. The rat plays the preponderant rôle as reservoir in interepidemic periods and may also carry the infection from one locality to another. But this does not explain the recurrence in cycles of acute epidemics. The author comes to the conclusion—a confirmation of the work of LONG in Peru—that it is due to a reintroduction into the country. The vector in this reintroduction is the plague flea brought to ports in bales of jute from India. A murine epizootic is started and then the human epidemic.

W F H

MACCHIAVELLO (Atilio) Estudios sobre la peste bubónica. II—Anatomía patológica de la peste murina en Antofagasta. [Pathology of Rat Plague in Antofagasta.]—*Rev Chilena de Hig y Med Preventiva* 1939 Jan-Mar Vol 2 No 1-3 pp 47-52. [13 refs.]

An analysis is made by the author of 18 154 rat autopsies out of a total of 25 000 with reference to plague infection. He divides the relative classes into suspicious 2 763 very suspicious 236 and definite 38. The lesions which led to the suspicion of plague were subcutaneous injection and any visceral or bubonic lesion. Of the visceral lesions those which were noted were found in lung liver and spleen. Among the 38 cases definitely proved plague by isolation of the plague bacillus there were 5 acute 64 chronic or subacute and 19 cases where although lesions were absent the bacteriological examination was positive.

W F H

LIU (C. Y) The Fleas of China. Order Siphonaptera.—*Philippine Jl Sci* 1939 Sept. Vol 70 No 1 pp 1-122. With 132 figs. [123 refs.]

ROSTER (H. J.) Verslag betreffende de pestbestrijding op Java over het jaar 1938. [Report on the Campaign against Plague in Java in 1938.]—*Meded Dienst d Volksgezondheid in Nederl Indië* 1939 Vol 28 No 2/3 pp 208-281. With 13 graphs & 8 maps. English summary p 256.

The total incidence of plague in Java during the year 1938 was 2,107 cases with 2,083 deaths distributed as follows: in West Java 1,471 cases, Mid Java 616 and East Java 20 cases. The epidemic has diminished both in extent and in severity. For a number of years the Priangan Regencies of West Java have formed the main focus.

Although the plague epidemic is essentially bubonic, 202 cases of primary pneumonic plague occurred as the result of many widely spread single transmissions together with a few small group infections. Only one real outbreak of primary pneumonic plague has been recorded which claimed 48 victims in the residency of Cheribon.

Inoculation on a large scale has been continued successfully with the living vaccine of Otten. In 1938 1 292,257 vaccinations, mainly re-vaccinations, were given. The total number during the period 1935-1938 inclusive is 7 430 299.

In the meantime house-remodelling as an anti-rat measure was carried on. The campaign in 1938 was an active one: the quatum of this year being 56,265 houses by which the total number has been brought up to 1,525,364.

Moreover 54 548 new houses have been built in this year under the supervision of the plague preventive service.

SOMEROV. Vrijwillige woningverbetering in het onderdistrict Madja (Regentschap Madjalengka) Residentie Cheribon. [Voluntary House Improvement in Madja as an Antiplague Measure.]—*Med. Dienst d. I Oost-Indië*—*Med. Ind. Ind. 1939* Vol. 23. No. 4. pp. 283-305 With 4 graphs & 1 map.

Systematic house improvement for the indigenous population as an antiplague measure has been officially adopted by the Netherlands Government in Java since 1914 when the first legislation was passed to make the measure compulsory. That procedure has had marked success and is economical in the long run, but costly to begin with and possibly unpopular. The case of Madja, a district of the Regency of Madjalengka in the Cheribon Residency bordering on the province of mid Java is offered, along with other districts of the Regency as an example. In this district of Madja the principle of voluntary house improvement was adopted. No compulsion was exercised except, perhaps, the indirect compulsion of strenuous official propaganda. The result may be claimed a complete success as judged by the object attained, a total disappearance of plague and a contented population. No bonus and no official advances were offered to the people for the betterment. All the inducement held out, except that of manifest self advantage was a premium of 3 florins for a completely reconditioned house. Why then should not the procedure adopted in this district be adopted elsewhere? There seems to be no answer but one to the question and that is Madja as a district was specially favoured for this campaign. A voluntary method is apt to be slow in comparison with official compulsion and therefore may defeat its object. In Madja it was not slow the people were well-to-do compulsory methods of inspection, condemnation of houses, spleen puncture after death in suspected cases and isolation of contacts were unpopular materials such as wood, bamboo and tiles were abundant in the district technical advice was fully available road communications were good. These and other factors, and especially the energy of the officials concerned, were doubtless responsible for making of Madja a model district. Details are given of procedure. A total number of houses amounting to 8070 in February 1935 were due for improvement. In 1936 only 3 per cent. had been reconditioned by 1937 80 per cent. and by 1938 97 per cent. At the end of March 1939 there remained a mere 0.38 per cent. of houses which had not been improved. It is fully recognized that such a success could not be so swiftly accomplished everywhere. The example of Madja, however is, at least, an encouragement for the application of the voluntary as against a compulsory principle, where co-operation between government and the people can be obtained. W F H

SAVINO E. & ANCHEZAR (B). Vacinación antipestosa experimental con bacterias vivas. Experimental Vaccination with Living Plague Vaccine.—*Rev. Inst. Bacteriol.* Buenos Aires. 1939 Dec. Vol. 9 No. 2 pp 122-141 With 6 figs. 31 refs.]

The attenuated strains of plague known as E.V. and Tjwidej were used to vaccinate guinea-pigs which were then tested by inoculation of virulent plague. In the course of vaccination about 30 per cent. of the animals die and continue to die after being inoculated with virulent plague without, however showing plague infection. The remainder survive the test inoculation and thus demonstrate the

existence of a very solid immunity. The two strains used for immunizing give rise to the formation of a nodule in the subcutaneous tissue whereas avirulent but non immunizing strains produce no such nodule. The E V strain on intraperitoneal inoculation gives rise to granulations in the spleen, while the Tjwideoj strain does not and the former strain is superior in immunizing power to the latter [see also this *Bulletin* 1939 Vol. 36 p 313] W F H

SOKHEY (S S) CHITRE (G D) & GORHALE (S K.) The Relative Value of Some Proprietary Cyanide Preparations for the Extermination of Rats and Fleas as a Plague-Preventive Measure—*Indian J Med Res* 1939 Oct. Vol. 27 No 2. pp. 389-407 With 1 diagram.

The introductory remarks to this article probably have a wider application than to the case of India alone. The authors state — "Rat proofing of dwellings and building suitable godowns for the storage of grain is not economically possible in India more so as the disease has become almost entirely a rural problem. Poison baiting and trapping are not very successful. The usual methods of dealing with fleas in dwellings by sprinkling emulsion of kerosene oil or pesterine are even less successful. Fumigation with hydrocyanic acid gas has always proved to be the most effective method of dealing with both rats and fleas but was dangerous. With the availability of new proprietary cyanide compounds fumigation of dwellings became a practical proposition. Under the conditions of testing employed one of the preparations "calcid briquettes" appears to have been eminently satisfactory—yielding its total theoretical content of hydrocyanic acid evolving the gas with rapidity so as quickly to reach a lethal concentration being furnished in an easily measurable form and being provided with an effective type of blower W F H

YOKOYAMA (Tamon) Mikrobiologische Studien ueber die Unterdrueckung der die pest Uebertragen den Tiere in der Mandschurei. [Microbiological Studies on the Suppression of Animal Vectors of Plague in Manchuria.]—*Jl Oriental Med* 1939 Sept. Vol. 31 No 3 [In Japanese pp 417-565 With 1 fig & 50 charts. [234 refs] German summary pp 39-40]

The ground squirrel *Citellus* is numerous and plays the chief part in the transmission of plague in Manchuria. *R. rattus* is rare and the Tarabagan is not found in that country. Experiments were conducted by the author with various strains of *Salmonella* for their infectivity on *Citellus* and *R. norvegicus*. He found that the strains Danyez Ratin 2 and Saba-Geru were potent in infecting the former. Danyez Ratin 2 and Hata 4 against the latter. Great care has to be exercised in the use of these various organisms in destroying plague rodents by infection lest infection of man is also caused. W F H

DANZEL (L.) L'activité raticide de la scille maritime rouge. (Red Scilla as a Ratfield.)—*Ann d'Hyg Pub Indust et Sociale* 1939 Sept Vol. 17 No 9 pp 381-395 With 1 fig

The advantage of red Scilla is that it has almost a selective action. Red Scilla kills the rat and the rat alone." Its specific botanical

name is *Urginea scilla* and it grows in the Mediterranean region. The white Scilla has no raticide power. Presumably the active principle is a glucoside but this has not been very definitely determined, although it ought to be if the powder is to be standardized and come into use for killing rats.

W F H

PELLAGRA.

PRÉCIS OF ABSTRACTS IN THIS SECTION

GREENFIELD and HOLMES (p. 430) report pellagra in a boy in England who lived under the same good conditions as other unaffected members of the family. After death (from bronchopneumonia) the post mortem findings were those of chronic gastritis and degeneration of somatic efferent neurones.

AYKROYD *et al* (p. 431) describe the condition of angular stomatitis with glossitis and anterior stomatitis, which may be associated with various skin lesions. These lesions were observed in pellagrins some years ago by STANUS and the authors show that nicotinic acid appears to have a curative action. TROWELL (p. 431) describes the condition of pigmented dermatitis with cracking and desquamation, mental irritability and diarrhoea, with oedema, seen in children in Uganda, and considers it to be of pellagrous origin and also allied to nutritional oedema associated with diet deficient in protein. MOORE (p. 432) in Nigeria describes the condition of retrobulbar neuritis associated with mouth and skin lesions and mental disturbance which responds to treatment with marmite or yeast even after autoclaving.

PLUNKETT (p. 432) describes five cases of suspected pellagra in Cyprus but STANUS points out certain objections to this diagnosis.

MAIXNER (p. 433) discusses the relatively slow rise in blood sugar in pellagrins after the injection of adrenalin. He (p. 434) considers the accentuated and prolonged fall in blood sugar following subcutaneous insulin in pellagra to be a specific reaction associated with hypoadrenalism, and that the latter hinders the normal absorption of nicotinic acid.

MEIKLEJOHN and HARK (p. 434) consider that in the B.E.S. test of urine it is not porphyrin-like substances but indol derivatives which give the reaction.

QUERIDO *et al* (p. 434) have devised a method, depending upon the fact that the only growth factor required by *Proteus* is nicotinamide, for estimating this substance in the blood. RITSEK (p. 435) gives the amounts of nicotinic acid found in urine, blood and various tissues. BALLIF *et al* (p. 435) found normal nicotinamide content in the blood of a series of pellagrins, and conclude that the part played by nicotinic acid is as yet not understood. LWOFF *et al* (p. 435) found low nicotinamide content in the blood of 15 of 21 pregnant women. BALLIF *et al* (p. 436) found low values of vitamin C in the cerebrospinal fluid of pellagrins and controls living on a poor diet but STANUS in comment points out that there is no evidence that parathion C deficiency plays a part in the pathogeny of pellagra.

SALVERSEN (p. 436) as a result of observation of two patients postulates a relative insufficiency of nicotinic acid on overdosing with vitamin B₁ or C. ALFORT *et al* (p. 437) consider that infestation with intestinal worms interferes with the absorption of vitamins, but STANUS criticizes the experiments quoted.

SYDENSTRICKER *et al* (p 437) found that an extract of human pellagrous liver had no curative action in pellagra though efficient in pernicious anaemia. Commercial liver extract on the other hand was active in pellagra. Nicotinic acid does not appear to be the only factor in treatment and causation of the disease. SERRELL and BUTLER (p 438) conclude from experiments that the syndrome known as pellagra *sine* pellagra is due to riboflavin deficiency and suggest that pellagra may be a mixture of symptoms of deficiency in nicotinic acid, riboflavin and thiamin. JOLLIFFE *et al* (p 438) describe the symptoms of riboflavin deficiency. SYDENSTRICKER *et al* (p 439) record success in the treatment of cheilitis (thought to be due to deficiency in riboflavin) associated with pellagra by the administration of riboflavin.

On the assumption that patients suffering from gastrogenic neurasthenia are actually sub-pellagrous MINDUS (p 439) obtained considerable improvement by giving a stomach extract and vitamins B₁ and B₂ together with extra meat and eggs.

FIELD and ROBINSON (p 440) show that nicotinic acid amide being a normal constituent of the blood, can be given in doses up to 500 mgm without the unpleasant effects sometimes experienced after nicotinic acid. KOOSER and BLANKENHORN (p 440) report favourably on treatment with nicotinic acid in America but GRECU *et al* (p 441) in Rumania have failed to obtain comparable results and are led to conclude that the clinical picture and pathogeny of the disease in the two countries may be different. HOU (p 441) in Shanghai shows that when oedema is present it is necessary to give increased protein as well as nicotinic acid.

Mention is made by several authors (CLECKLEY *et al* p 442 SALM p 442 LIVESCO p 442 SALEKAN p 443) of the good effects of nicotinic acid or the amide on the mental state of patients in some of whom this may be the only sign of pellagra. FROSTIG and SPIES (p 443) have analysed the mental changes in cases of pellagra in relapse largely consisting of hypersensitivity to and dislike of sensory stimuli. Intravenous cocarboxylase or vitamin B₁ were rapidly beneficial *nicotinic acid more slowly*.

KATZENELLENBOGEN (p 444) reports success in the treatment of epidemic glossitis with nicotinic acid and considers the condition to be due to deficiency in that substance. VILTER and SPIES (p 444) report dramatic relief of glossitis and mental symptoms in seven patients after treatment with quinolinic acid and discuss the implications of their findings. BILLS *et al* (p 445) report some success with pyrazine.

IONESCU *et al* (p 446) failed to effect improvement with histidine. BANDIER (p 446) successfully treated a series of patients with stomach preparations and discusses the nature of vitamin B₂. SPIES (p 447) has successfully treated patients with various eye symptoms with vitamin A.

C IV

SPIES (Tom D) VILTER (Richard W) & ASHE (William F) Pellagra, Beriberi and Riboflavin Deficiency in Human Beings. Diagnosis and Treatment.—*Jl Amer Med Assoc* 1939 Sept 2. Vol. 113 No 10 pp 931-937 [23 refs.]

A lecture delivered at the 90th Annual Session of the American Medical Association St. Louis giving a very useful summary of the more recent investigations by Spies and his co-workers in pellagra

and some other associated deficiency states. This address covers ground which has already been dealt with in a number of papers each of which has been summarized in this *Bulletin*. *H S SHERMAN.*

CARTER (Mariano R.), CAMPONUOVO (Luis E.) & BORRA (Julio M). Pellagra. [Pellagra].—*Revista Med Argentina* 1940. Feb. 14 Vol. 27 No. 7 pp. 333-353 With 7 figs. [94 refs]

- I. GREENFIELD (J G) & HOLMES (J MacDonald). A Case of Pellagra. The Pathological Changes in the Spinal Cord.—*Brit Med J*. 1939 Apr 22 pp 815-819 With 4 figs. on special plate. [25 refs]
- II. SEANNUS (Hugh S). Pellagra. [Correspondence].—*Ibid* May 6, p. 950

i In this very interesting article brief reference is first made to the case of a 35-year-old farm labourer who came under observation for a short time in Staffordshire with mild dermal, intestinal, mental and neurological symptoms of pellagra and then a detailed case report is given of a 5-year-old boy admitted to the Staffordshire General Infirmary on 4th July 1937 suffering from the disease. There were 5 other children in the family—boys aged 11 and 13 girls aged 7 14 and 17 years, all of whom were well. The whole family lived under the same conditions with an excellent mixed diet. In May 1936 the patient had had typically distributed skin lesions which had cleared up in September to reappear in June 1937. The case was a most typical one in regard to affection of skin, scrotum, perineum, mouth, lips and tongue associated with looseness of the bowels, mental and nervous symptoms. Except for complete achlorhydria with no response to histamine pathological investigations revealed nothing of note. Treatment consisted in giving six drachms of yeast per day 4 cc. campolon were given on 15th and 22nd July. Within two weeks there was marked improvement—the child had lost his drowsiness, he could raise himself and stand once more the mental condition was much better and he could talk—the skin had healed.

On 26th July he developed measles and died two days later of bronchopneumonia. Post mortem examination apart from the bronchopneumonia, revealed nothing of interest except signs of a chronic gastritis—the "état mameleonné".

The report on the histological examination is full and of great interest. "The condition in the nervous system was one of neuronal degeneration in which somatic efferent neurons both upper and lower and the neurons which have their cell station in the dorsal root ganglia were chiefly affected, with some degeneration in the spino-cerebellar tracts. There was severe involvement of the basal ganglia and motor cortex and changes less intense in other parts of the cortex. The full account should be read by all interested in pellagra.

II. In this letter attention is drawn to some among many points of interest in the case above mentioned—the close resemblance of one case to another among children—the fact that many more cases of pellagra occur in this country than are published—the selective incidence of pellagra in a family living under the same conditions—suggesting the intervention of some unknown factor—the paucity of

post-mortem findings in uncomplicated pellagra the difficulty of correlating the neuro-histological changes with symptoms met with during life

H S S

STANNUS (Hugh S) Pellagra.—*Lancet* 1940 Feb 24 pp 352-355 [45 refs.]

AYKROYD (W R.) KRISHNAN (B G) & PASSMORE (R.) Stomatitis of Dietary Origin.—*Lancet* 1939 Oct 14 pp 825-828 [19 refs.]

Nearly thirty years ago the reviewer drew attention to a condition noted among native African pellagrins for which he used the term angular stomatitis. The condition has since become well recognized both as a sign in pellagra and as a sign associated with one or more pellagrous symptoms but without the typical skin condition forming a number of syndromes which the reviewer collected together for discussion in 1936. Among these conditions was one described by the authors common in Indians of the poorer classes living on a diet largely composed of rice and deficient in milk and vegetables in which the lesions at the angles of the mouth were associated with a glossitis and an anterior stomatitis. Excoriations at the palpebral angles and in the region of the alae of the nose erosion of the mucocutaneous [sic] junctions of the prepuce anus and vagina and eczema of the scrotum may also develop—again all signs first described by the reviewer as noted in pellagrins.

The condition was originally believed by the authors to be due to a vitamin A deficiency. Later based upon the observation that the stomatitis was cured or improved by the administration of alkaline autoclaved yeast it was concluded that the antistomatitis vitamin is probably identical with the factor in the vitamin B₂ complex which is effective in treating human pellagra.

Recently in America angular stomatitis has been written down as a symptom due to riboflavin deficiency and one which does not respond to treatment with nicotinic acid. Aykroyd points out that their good results were obtained with alkaline autoclaved yeast in which the flavin present was presumably destroyed.

In the present investigation the effect of nicotinic acid therapy was tried in these Indian cases. Fifty mgm. nicotinic acid was given daily to each of 14 patients for 28 days. Four greatly improved 5 showed some improvement 5 remained unchanged. Among 9 controls untreated 3 showed slight improvement 5 remained unchanged, 1 became worse. These results it is stated suggest that a nicotinic acid deficiency is concerned in the causation of these cases of stomatitis. In most cases the glossitis immediately improved. The problem as the authors state needs much further clarification.

H S S

TROWELL (H C.) Infantile Pellagra.—*Trans Roy Soc Trop Med & Hyg* 1940 Jan. 29 Vol 33 No 4 pp 389-404 With 4 figs. (3 on 2 plates) [76 refs.]

This article itself a review of the published communications on the subject is a little difficult to summarize. It will be read by all those who may meet with similar conditions in tropical native races with interest. A large number of the earlier observations beginning with those of R A W PROCTOR (1926) in Kenya, came from Africa and

included those of C. WILLIAMS (1833) and R. U. GILLAN (1834). These were collected together by H. S. STANSBURY (1836) [this *Bulletin* 1836, Vol. 33 p 729] who pointed out that they referred to a condition which must be recognized as pellagrous. The following year H. C. Trowell again reviewed these cases in Africa, but in the present paper he deals with the condition as it has been reported not only from East and West Africa but also from Congo Central America, the United States and elsewhere. The essential features of the affection are the occurrence of deeply pigmented patches of dermatitis with cracking and desquamation on the limbs and elsewhere, mental irritability diarrhoea, etc. together with oedema of face and extremities or more widespread.

The clinical picture in various groups of cases varies somewhat, suggesting a deficiency of more than one dietetic factor. While confirming the essentially pellagrous nature of the condition Trowell believes that the oedema is probably allied to "nutritional oedema" associated with a diet deficient in protein. H S S

MOORE (D Fitzgerald) Retrobulbar Neuritis & Pellagra in Nigeria.—*Jl Trop Med & Hyg* 1839 Apr 15 Vol 42 No 8 pp 106-114 With 5 figs [16 refs]

Among the many conditions which have been recorded among native races in various parts of the world (see this *Bulletin* 1836, Vol 33, p. 885) as due to dietetic deficiencies, one of the most interesting is that originally described by Dr FITZGERALD-MOORE in 1834 (this *Bulletin* 1834 Vol 31 p 820).

In the present article the author brings his observations up to date. The syndrome with which he deals consists essentially in a retrobulbar neuritis associated with soreness of the tongue, angular stomatitis, a dry scaly condition of the skin of the genitalia and areas subjected to pressure together with mild mental changes and burning feet. The affection is found among the unemployed, pregnant mothers in poor circumstances immigrant town labourers and above all among the boarders of schools in which the diet is poor.

It responds to treatment with marmite, dried brewer's yeast and the same products after being autoclaved, the skin and mouth lesions clearing up in a few weeks, the visual defects in 3 or 4 months provided the disease has not existed too long. Unfortunately it was not possible to carry out a fair trial of nicotinic acid in these cases. Reference is made to the observations of others concerning retrobulbar neuritis in pellagra and reasons are given for believing that this condition in West Africa is pellagrous.

In the latter part of his article the author discusses food supplies of these natives and food in relation to income and alludes to some general principles underlying a sound policy in regard to nutrition. Reference is also made to the possibility that manioc (gari) plays some part as a toxic element in the dietary. H S S

PLEVAETT (O R L L) Observations and Clinical Notes on Some Cases of Pellagra seen in Cyprus.—*Jl Roy Army Med Corps*. 1839 May Vol 72 No 5 pp 317-327 With 5 figs.

Two cases diagnosed as pellagra, one of probable pellagra and two others in which the condition was thought to be pellagra sine pellagra

are reported making five in all—five out of nine wives on a military station four were wives of sergeants one the wife of a captain R.A.M.C.

The case histories are not very full and no clinico-pathological investigations were possible.

The diagnosis in the first two cases depended on the appearance of a rash on the skin of exposed parts a red and puffy face with some loss of appetite listlessness and irritability. In the third case there was a similar rash. In the other two cases there were diarrhoea, loss of weight sore mouth depression and irritability but no rash. In the last of these cases there was noted the passage of very large quantities (4 oz at a time) of mucus *per rectum*. The rash is said to have resembled closely lichen planus though of a different colour and different distribution and the suggestion is made that lichen planus may be a form of pellagra in less sunny countries. Improvement occurred with treatment by bemax marmite yeast milk and a good mixed diet. The dietary preceding the illness was considered a poor one.

[On reading this account one is left with a sense of being unconvinced. The description of the exanthem is a little odd the mental changes were no more than are commonly met with in many affections of the skin. A mucous colitis is no part of pellagra. The deficiencies in the diet hardly sound sufficient to cause pellagra. The suggestion that lichen planus may represent pellagra in a temperate zone is made surely in ignorance of the fact that the skin lesions in temperate countries resemble exactly those occurring in the tropics.

The author makes a point of the fact that in his first case the exanthem occurred at a time when the patient had not been exposed to the sun for two months and believes this is the first time such a phenomenon has been recorded. It is an interesting observation but the subject was discussed for the first time and an explanation offered by the reviewer some years ago (this *Bulletin* 1937 Vol. 34 p 183)]

H S S

MAINZER (Fritz) Ueber Pellagra. III Mitteilung Die Blutzuckerkurve der Pellagrakranken nach peroraler Zufuhr von Traubenzucker und nach subkutaner Gabe von Adrenalin. [The Blood Sugar in Pellagra after Oral Glucose and Subcutaneous Adrenalin] —*Acta Med Scandinavica* 1939 Vol. 100 No. 3-5 pp 231-243 With 2 figs.

The rise in blood sugar content after the ingestion of glucose 30 gm. is the same in pellagrins as in normal individuals showing that in that disease there is no difficulty in glucose absorption. Among pellagrins however after an injection of 0.5 mgm adrenalin this rise in blood sugar is twice as slow as among normal persons.

It will be necessary to find out whether this picture is provoked by a lack of glycogen reserves in pellagra or possibly by lesions of the sympathetic, the pituitary or thymus in other words whether the lesion is nervous or humoral. Defective function of the adrenal glands is probably a factor but not the only one

H S S

More recent investigations go to show that values between 0.62 and 0.70 should be considered subnormal. The Proteus test of Fildes has been used in all cases. Believing that minor degrees of what they call P. P. avitaminosis may occur due to deficiency in absorption or metabolism rather than due to a deficiency in the diet, they made estimations of the nicotinamide content of the blood in pregnant women who as has been shown by others, are liable to vitamin deficiencies in other directions.

Fifteen of twenty-one pregnant women tested showed low levels—the average being 0.57 mgm. per 100 cc. the lowest value was 0.37 (In the present state of our knowledge it seems a pity to call nicotinic acid or the amide specifically the "pellagra preventive factor" the problem is not yet solved.)

H S S

* EULER (Hans) & SCHLEICK (Fritz). Nicotinamide and Co-Zymase im Blut. [Nicotinic Acid Amide and Cozymase in the Blood.]—*Klin. Woch.* 1939 Aug 19 Vol 18 No 33 pp 1109-1111 (21 refs)

BALLIF (L.) NITULESCU (J.) ORNITHID (I.) & BALLIF (L. E.) Sur la teneur en acide ascorbique du liquide céphalo-rachidien chez les pellagriques. [The Ascorbic Acid Content of the Cerebrospinal Fluid in Pellagrics.]—*C. R. Soc. Biol.* 1939 Vol 130 No 14 pp 1585-1589

Some have thought that a vitamin C deficiency is a factor in causation of pellagra.

The authors working in Moldavia and using the indophenol titration method of Tullmans and Harris, have made estimations of the vitamin C content of cerebrospinal fluid in 36 cases of pellagra.

In 28 of the 36 cases values below 0.6 mgm. per 100 cc. were found in 22 the figure was below 0.3. The same low values were however found in controls—cases admitted to hospitals for various nervous and mental diseases. The well-balanced diet received in hospital caused no rise in the vitamin C content of patients with low values all of whom before admission were living on a pellagra-producing diet. On the other hand the exhibition of 500 mgm. of pure vitamin C for 5 days produced a three fold rise in the c.s.f. content of vitamin C.

The authors found no correlation between lowered values and increasing age as described by MARINESCU. (Low contents for vitamin C must be of common occurrence among pellagrics in endemic areas judging by the dietaries in such areas. Though such populations live on the edge of a scorbutic precipice so to speak there is no evidence that the partial C deficiency plays a part in the pathogeny of pellagra.)

H S S

SALVESEN (Olaf). Pellagra og pellagrose hndforandringer efter behandling med vitamin B₃ og vitamin C. [Pellagra and Pellagrous Dermatitis after Treatment with Vitamins B₃ and C.]—*Vidensk. Med.* 1940 Feb 17 Vol 5 No 7 pp. 279-282 With 3 figs. English summary

A report is given of 3 cases of pellagrous dermatitis due to treatment with vitamin B and vitamin C. In the first case is described a patient with pellagra without dermatitis, who had previously been subjected to gastroenterostomy. The diet had been sufficient in the P.P. factor. The patient grew worse during treatment with vitamin B₃ and yeast, and

typical pellagrous dermatitis was observed, but all the symptoms were improved during treatment with nicotinic acid. Later there was twice relapse on discontinuing nicotinic acid and therefore he is now continually being treated with nicotinic acid.

In the second case there was no B-avitaminosis but the patient was over treated with vitamin B₁ and during this treatment typical pellagrous dermatitis appeared, but no other symptoms of pellagra.

The third patient developed typical pellagrous dermatitis during over treatment with ascorbic acid.

It may be reasonable to suppose there is relative insufficiency of nicotinic acid on over-dosing with vitamin B₁ or vitamin C which are supposed to act synergically

ALPORT (A Cecil) GHALIOUNGUI (P) & EL GHARINY (Abbas)
Defective Gastro-Intestinal Absorption in Pellagra.—*Jl Egyptian Med Assoc* 1939 Apr Vol 22, No 4 pp 191-197 With 2 charts [12 refs.]

The authors are among those who believe that deficient intestinal absorption plays an important part in the causation of pellagra. The high percentage of pellagrins in Egypt exhibiting helminth infections is considered a point of importance in this relation. It was thought of interest to try to determine whether malabsorption from the intestine among pellagrins also applied to other vitamins and vitamin C was chosen for the experiment. The authors' conclusions were that pellagrins to whom 300 mgm. ascorbic acid were given by mouth excrete in the urine less vitamin C than normal persons. If the acid be given by injection excretion is normal.

[The pellagrins and controls each numbered 25 persons. all the pellagrins it is stated, had worm infestations but nothing is said concerning helminth infections in the controls. The experiment seems to miss the point. There are two questions at issue—(1) Do helminth infestations of the bowel lead to malabsorption of vitamins from the intestine? (2) If this be true does such malabsorption lead to the production of pellagra? From the observations so far made neither question receives an answer.] H S S

SYDENSTRICKER (V P) SCHMIDT (H L) Jr GEESLIN (L E) & WEAVER (J W)
The Liver in Pellagra.—*Amer Jl Med Sci* 1939 June Vol 197 No 6 pp 755-763 With 3 charts [27 refs.]

Before the introduction of nicotinic acid in the treatment of pellagra good results had been obtained by the exhibition of liver extracts.

Since crude liver extracts were later found to contain nicotinic acid it was assumed that their potency depended on their nicotinic acid content. It has however been demonstrated that the most efficacious remedy for intravenous use is the G fraction of Cohn which owing to its method of preparation must contain no nicotinic acid though there may be present very small amounts of nicotinamide.

The authors seized the opportunity presented by the death of an advanced case of pellagra under their care of preparing an extract by Cohn's method of human pellagrous liver. This preparation which contained no demonstrable nicotinic acid or nicotinamide produced a prompt and satisfactory reticulocyte response in a case of pernicious anaemia. Given in doses of 25 cc intravenously to two pellagrins

and symptoms in both groups were lassitude, anorexia, loss of weight, simple anaemia, melaemia, amenorrhoea, restlessness and anxiety or apathy. These patients fitted, in other words, into the clinical picture commonly labelled "gastrogenic neurasthenia." The two groups were identical except for this, that the average age of the patients was higher and the duration of the disease was somewhat longer in the first than in the second group.

While the second group served as a control, the first group was treated on the assumption that the patients in it were anti-pellagrous. They were given hydrochloric acid and a stomach extract, and some of them were also given vitamins B₁ and B₂. Extra rations of meat and eggs were also provided. The patients in the second group were given the routine treatment with sedatives, etc., but they received no extra supply of vitamins and were given no stomach extract. This experiment having been carried out in the autumn of 1937 ELVENJELM's discovery of the action of nicotinic acid was not yet known and could not, therefore be exploited. The two groups were compared by two assessors one of whom did not know to which group each of the patients he examined belonged. They were classified according as they had recovered, had improved, or had not improved. Thus judged, the patients in the first group fared on the whole considerably better than those in the second group. C Lillingston

FIELD (Henry) Jr & ROBINSON (William D.) The Absence of Reactions following Therapeutic Doses of Nicotinic Acid Amide.—*Amer J Med Sci* 1940 Feb Vol 189 No. 2 pp. 275-278. 17 refs.

Since nicotinic acid amide is a normal constituent of the body while nicotinic acid is not, it might have been expected that though the latter produced definitely unpleasant symptoms when administered to man the former would not do so. This of course is known to be the case. The fact is confirmed by the author who shows that up to 500 mgm. doses of the amide may be given on an empty stomach without causing any vasodilatation or any abdominal, cerebral or cardiac symptoms. H S S

KOOSER (John H.) & BLANKENBORN (M. A.) Pellagra of Kentucky Mountain Folk. Ambulatory Treatment with Nicotinic Acid.—*Jl Amer Med Assoc* 1939 June 24 Vol. 112 No. 25. pp 2581-2584

During the period 15th May to 1st November 1938, an attempt was made to treat at an outpatient clinic such cases of pellagra as were thereto referred. Their number was 41—5 males and 36 females, many of whom were pregnant. They came from a mountain folk employed in coal mining who no longer farm the land but live for the main part on syrup, cornmeal and fat meat. Pellagra has long been endemic there. Of the 41 patients 24 had had 1 to 10 previous attacks, 17 were in the initial attack.

Treatment consisted in giving a week's supply of tablets of nicotinic acid. 150-200 mgm daily was the dose in most cases but 800 mgm. or more were occasionally necessary. Treatment was carried on for 3 weeks. All patients improved but in only 23 was complete relief of symptoms seen, in the remainder a good deal of ill-health persisted.

The symptoms in the 41 cases besides the dermatitis were diarrhoea in 15 constipation 6 anorexia 29 loss of weight 19 glossitis 22 stomatitis 8 vaginitis 3
H S S

GRECU (Aurel) IONESCU (N Gruiu) CLAUDIAN (I) & CONSTANTINESCU (P) Contributions au traitement de la pellagre en Roumanie par l'acide nicotinique. [Treatment of Pellagra with Nicotinic Acid.]—*Bull et Mém Soc Méd Hôp St de Bucarest* 1939 Nov-Dec. Vol. 21 No 9-10 pp 493-504 [47 refs.]

In a previous communication these authors on a basis of 18 cases of pellagra treated with nicotinic acid, found that their results were in no way comparable with those obtained by American observers [see this *Bulletin* 1939 Vol. 36 p 552]

The present article gives their further results in an attempt to evaluate treatment by nicotinic acid and nicotinamide. The 50 cases studied were divided into three groups and details of each are given in the form of tables with analyses. The first group received the ordinary hospital diet the second one containing no pellagra preventive factor the third received a diet as in the first but were treated by hygieno-dietetic means and usual medicines for a preliminary period. The specific treatment consisted in the administration of nicotinic acid or its amide in doses of 100-800 mgm per day for periods varying from 2 to 26 days—the total quantity being from 1.4 to 3.6 gm.

The results in group 2 were worse than in group 1. Of those in group 3 two-thirds improved under non-specific treatment and those that did not so improve remain uninfluenced by nicotinic acid. The authors reach the conclusion that nicotinic acid appears to be an adjuvant of a certain value in treatment but difficult to estimate. The dosage remains an unsettled question. The amide appears to be more active than nicotinic acid. Lastly they think that the clinical picture of pellagra in Rumania may differ from that in the United States and that there may be differences in pathogeny in the two countries.
H S S

HOU (H C) Pellagra and its Treatment with Nicotinic Acid.—*Chinese Med J* 1939 June. Vol. 55 No 6. pp 528-536 With 4 figs.

Some notes upon six cases of pellagra of fairly mild type met with at the Institute of Medical Research Hospital, Shanghai, in August and September 1938 four of which were treated with nicotinic acid and two with yeast. Five were males one a female all had been living on a diet which appeared to be deficient in vitamin B₃. All yielded satisfactorily to treatment. One showed signs of vitamin B₁ deficiency and was treated with that vitamin. Others showed oedema which did not clear up until the protein content of the diet had been increased.
H S S

DAVIS (J Preston) The Symptoms, Diagnosis and Treatment of Pellagra with Special Reference to the Use of Nicotinic Acid.—*New Orleans Med & Surg J*. 1939 Dec. Vol. 92. No 6 pp 315-320

ROBERTSON (Douglas S) Nicotinic Acid Treatment of Pellagra. With Report of a Case occurring in Edinburgh.—*Edinburgh Med J* 1940 Feb. Vol. 47 No 2. pp 81-85

CLECKLEY (H. M.) SYDRXSTRICKER (V. P.) & GRESLEY (L. E.).
Nicotinic Acid in the Treatment of Atypical Psychotic States
associated with Malnutrition.—*Jl. Amer Med Assoc.* 1939
May 27 Vol 112. No. 21 pp 2107-2110

Nineteen patients with no history or symptoms of pellagra in the generally accepted sense but exhibiting mental changes characterized by stupor associated with glossitis were submitted to treatment with nicotinic acid.

The patients were in all cases older people and all had organic disease, mostly arteriosclerosis. They had all suffered a period of chronic inadequate nutrition. Glossitis was present in all but two. In one only was stomatitis found. In two vaginitis was present in none diarrhoea or skin lesions.

The nicotinic acid, except in one case was administered intravenously as sodium nicotinate in doses of 100 to 300 mgm. daily for 3-10 days.

In 4 cases there was great improvement, in 15 "cure" was dramatic.

In view of the therapeutic reaction to nicotinic acid these cases must be diagnosed as pellagra and the conclusion is arrived at that "cerebral" (mental) symptoms may be the earliest symptoms of a nicotinic acid depletion. H S S

SALM (H.) Eine Pellagraerkrankung im bayrischen Schwaben, deren körperlichen und geistigen Störungen durch Nikotinsäureamid (Merck) geheilt wurden. [Physical and Mental Disturbances of Pellagra cured by Nicotinic Acid in Bavaria].—*Merck Med Woch* 1939 June 9 Vol 68 No 23. pp. 882-884. [16 refs.]

Most of the cases of pellagra in Germany are met with in mental institutions, 84 per cent of them being women. In the present article the case of a 38-year-old woman is described from Munich. She was transferred to a mental institution from hospital whither she had been admitted undiagnosed from very poor and dirty surroundings. She had lived on bread, potatoes, and a few vegetables. The case as far as the description goes was a typical one of chronic pellagra in a late stage—rash, digestive disturbances dementia with hallucination and suicidal tendencies, etc. Treatment by means of nicotinic acid was followed by rapid improvement she was able to leave the mental hospital, well, after 8 weeks. H S S

LIVESCO (M.) Le traitement de la pellagre par l'amide de l'acide nicotinique. [The Treatment of Pellagra by Nicotinic Acid Amide.]—*Bull Acad Med Roumanie* 1939 4th Year Vol 8 No. 5-8. pp 430-441

The author describes in brief three pellagrous patients with acute mental symptoms who after having suffered for a long period and undergone various forms of treatment, showed considerable improvement in a couple of days after taking nicotinic acid amide and were able to leave hospital in 10 days or so. The history of one case will suffice the others were very similar.

A man of 52 years had shown pellagrous symptoms for 3-4 years. Two or three weeks before admission to hospital he lost his appetite, became depressed and taciturn, and later agitated, uttering inarticulate cries and destroying clothing and surrounding objects. He suffered

also from diarrhoea and passed stools in his room regardless of conveniences.

He was given nicotinic acid amide in small doses increasing rapidly to 30-40 cgm. daily. By the third day after this treatment was started he became calm and talked sensibly with those about him and asked for food. He still seemed depressed. After four days the drug was stopped. He maintained his improved state for 2-3 days and then relapsed again to delirium and agitation. Resumption of the drug was followed in two days by amelioration and administration was kept up for another 4-5 days. The improvement continued and the patient left hospital in ten days in a normal state. Previous to this treatment during two years by iron arsenic hydrochloric acid, pepsin and brewers yeast separately and combined had proved ineffectual.

H H S

SALEKAN Een geval van pellagra behandeld met nicotinezuur
[A Case of Pellagra treated with Nicotinic Acid]—*Geneesk.
Tijdschr v Nederl Indië* 1939 Aug 8 Vol 79 No 32.
pp 2013-2016 With 2 figs. on 1 plate

The case here recorded is that of a European woman of 40 years in Buitenzorg. Her previous history mentioned amoebic dysentery which was treated with injections of emetine. After this she put herself on a much restricted diet and became a vegetarian. She suffered from delusions and hypochondria. reflexes were normal. There was some degree of anaemia red cells 5 million haemoglobin 70 per cent. colour index 0.7 white corpuscles 8300 with some relative lymphocytosis 30 per cent. She presented a typical pellagra rash on face hands and feet. She was given nicotinic acid, 5 mgm. three times a day and in three days there was marked improvement in the local symptoms, but the psychical were becoming more manic than depressive. her general behaviour however was better and she was beginning to pay more attention to her surroundings. It is thought that the pellagra was brought on by her voluntarily restricted diet.

H H S

FROSTIG (J P) & SPIES (T D) The Initial Nervous Syndrome of Pellagra and Associated Deficiency Diseases.—*Amer Jl Med Sci* 1940 Feb Vol 199 No 2. pp 268-274

Mental changes are not uncommon in cases of pellagra in relapse. Sixty such cases many of them showing an associated beriberi and riboflavin deficiency were selected for this special study in which an analysis of the symptoms and experiences reported by the patients has been made. It was found that the symptoms varied very little in the whole group individual mental make-up played little or no part in determining the picture. The symptoms consist of—hypersensibility to all forms of sensory stimuli with dislike engendered by the hypersensibility to noises or music, sweet smell or evil odour etc. The smell of cooking may be absolutely intolerable certain abnormal skin sensations—difficult to define and difficult to differentiate in regard to causation, those for instance which might be considered as subjective from those which might be ascribed to a neuritis restlessness fidgetiness sleeplessness associated with physical weakness and increased fatigability oversensitiveness excitability emotionalism with apprehensiveness in the majority—always on edge dizziness—

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a very common symptom and headache which the authors hold is of true migrainous type.

Many of these cases were treated with large doses of cocarboxylase, nicotinic acid, riboflavin or synthetic vitamin B₂ but the results will be published later elsewhere—a note is made however that the intravenous injection of cocarboxylase or vitamin B₂ “produced an almost immediate reversal of the neurologic signs within a few hours.” Nicotinic acid produced the same effect but more slowly. Disturbances of touch and pain and corneal reflex improved in 24 hours but not so altered tendon reflexes, nystagmus and weakened accommodation.

H S S

MARU (A. M.) Acute Dementia due to Pellagra treated by Nicotinic Acid.—*Med Bull Bombay* 1939 Dec 2. Vol. 7 No 23 pp 740-741

LEWY (F. H.) HEDWICH (H. E.) FROSTIO (J. P.) & SPIES (T. D.) The Effect of Cocarboxylase upon Metabolism and Neuro-Psychiatric Phenomena in Pellagrins with Beriberi.—*Science* 1939 Aug 11 Vol. 90 No 2328 p 141

KATZENELLENBOGEN (I.) Nicotinic Acid in Endemic Glossitis.—*Lancet* 1939 June 3 pp. 1260-1262. [13 refs.]

In 1928 the author published an account of what he referred to as epidemic glossitis in which he incriminated the pneumococcus as playing an important rôle [this *Bulletin* 1928 Vol 25 p 996]. In subsequent years the number of cases fell but in November and December of 1938 there was a considerable increase. The glossitis is associated with soreness at the angles of the mouth and salivation and sore throat. The reviewer in collecting together a number of conditions having symptoms analogous to pellagra drew attention to Katzenellenbogen's observations, but that author has never observed the appearance of other pellagrous manifestations in his cases. He however determined to try out the effect of nicotinic acid in his more recent cases and gives case notes of six patients thus treated.

Altogether 24 patients were submitted to nicotinic acid therapy—50 mgm. being given 3 or 4 times a day. In 21 the symptoms disappeared, in 3 no improvement resulted. In one refractory case the same dose was given 8 times a day with no improvement.

The condition is therefore now considered to be due to a deficiency in nicotinic acid but no explanation is offered for the failures.

(It would be interesting to see what effect riboflavin either alone or in combination with nicotinic acid would have on these cases.)

H S S

VILTER (Richard W.) & SPIES (Tom D.) Antipellagric Properties of

doses over a period of five hours was administered orally to 6 cases. The response was dramatic the fiery glossitis faded within six hours of the first dose the mucous membrane of the mouth regained its normal appearance at the end of twenty four hours. The patients reported increased strength and sense of well-being. One case exhibiting mental confusion and nervous instability was mentally normal in twenty-four hours.

In all of seven cases the concentration of co-enzymes I and II in the blood rose to normal in twenty four hours. This study demonstrates a biological difference between human pellagra and canine black tongue.

Previously another biological difference had been shown by SPIES and co-workers (1938) in that pigments soluble in ether and having a reddish purple colour in 25 per cent HCl appear in the urine of pellagrins in relapse but not in the urine of dogs with black tongue.

It would appear therefore that all the organisms which require pyridine nucleotides for normal cell respiration do not necessarily use the same pyridine derivatives for the biological synthesis of those nucleotides.

(It will be noted that response of the glossitis and stomatitis and in one case mental confusion only is mentioned, other symptoms if any receive no comment.)

H S S

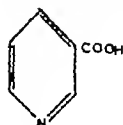
BILLS (Charles E.) McDONALD (Francis G.) & SPIES (Tom D.) Anti-pellagric Action of Pyrazine-2, 3-Dicarboxylic Acid and Pyrazine Monocarboxylic Acid—*Southern Med J* 1939 Aug Vol. 32 No 8 pp 793-796 With 1 fig

In a previous paper the anti-pellagra activity of certain of the pyridine carboxylic acids was described [see this *Bulletin* 1939 Vol 36 p 557]. The present article deals with the effects of carboxylic acid derivatives of pyrazine a substance containing two nitrogen atoms in the ring instead of one as in pyridine and one which is not known to occur in any physiological substance or in any known vitamin though reduced pyrazine derivatives have been found.

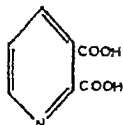
The preparation used was pyrazine-2, 3-dicarboxylic acid the homologue of quinaldic acid dealt with above in doses of 100 mgm five times a day a dosage which was found non toxic in volunteers.

Six cases of mild pellagra in relapse were so treated. It is merely stated that a sense of well being was experienced and the glossitis relieved in 2-24 hours.

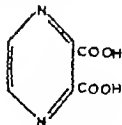
Pyrazine mono-carboxylic acid was also found to yield the same favourable response. Both the substances produce an increase in the co-enzyme I (cozymase) and co-enzyme II (coferment) content of blood and urine [see this *Bulletin* 1939 Vol. 36 p 548].



Nicotinic Acid



Quinaldic Acid



Pyrazine-2, 3-dicarboxylic acid

H S S

IONESCU (N. Grila) CLAUDIAX (L.) & CONSTANTINESCU (P.) A propos du traitement de la pellagre par l'histidine. [The Treatment of Pellagra with Histidine.]—*Bull et Mém Soc Méd Hôp de Bucarest*. 1939 Nov-Dec. Vol. 21 No. 9-10 pp. 505-513

An article in which the authors criticize the results claimed by I. BOGDAN in the treatment of pellagra by histidine.

The treatment adopted in the majority of some ninety cases was 10 daily intramuscular injections of 0.200 mgm. (sic) histidine

The present authors have been unable to confirm the brilliant results claimed by Bogdan. They found "no favourable influence on the clinical symptoms of pellagra" in 15 cases treated. They point out that Bogdan's cases were all treated in the months of April, May and June and that the duration of symptoms was not mentioned by him. It seemed possible that nothing more than a natural ending to the "attack" was observed. H S S

BANDIER (Erik) On the Treatment of Exogenous Pellagra with Stomach Preparations, and Considerations on the Possible Identity of the Vitamin B₂ Complex with the "Cyanide Insensitive Enzyme Complex."—*Acta Med Scandinavica* 1939 Vol. 101 No. 4-6 pp. 493-510 [19 refs]

Two years ago consequent upon some animal experimental work, PETRI and his associates put to the test the treatment in Copenhagen, of what the author calls "endogenous pellagra (i.e. pellagra associated with some pre-existing gastro-intestinal dysfunction) with human gastric juice and ventriculin-hydrochloric acid. The results were excellent, pellagrous symptoms disappeared within a month [see this *Bulletin* 1938, Vol. 35 p. 316]

The present paper deals with the results obtained in 16 cases of endemic pellagra ("exogenous pellagra of the author) treated in Moldavia where 4 to 6 per cent of the population show signs of the disease

To seven patients ventriculin gm 10 plus hydrochloric acid (7 per cent) in 25 were given three daily at mealtimes. Of another group of nine patients to 3 was given the treatment as above to 3 Fundin was given with hydrochloric acid, to 3 Pylorm with acid—all prepared from pig's stomach. The first group of patients all showed typical dermatitis, stomatitis, glossitis achlorhydria and gastro-intestinal disturbance but no nervous signs and no mental symptoms. All responded to treatment

The second group were only under observation for a short time but again all showed good response. Though the cases are few in number and there were no controls it is claimed that the reaction to this treatment was prompt and definite

In the second part of the paper the author refers to some of the results obtained in the United States with nicotinic acid and riboflavin and to facts elucidated by others in regard to the part played by certain fractions of liver extract adding that "it seems a near call to assume that the substance termed the vitamin B₂ complex is identical with the so-called cyanide insensitive system" i.e. an enzyme complex which comprises (1) The yellow respiration ferment (Warburg and Christian) (2) The co-ferment (Warburg and Christian)

or co-zymase (Euler Albers and Scienk)
Zwischenferment

(3) The so-called

[This long shot is unquestionably near the truth as will shortly
be demonstrated.] H S S

SPIES (Tom D) A Note on the Ocular Symptoms occurring from
Malnutrition in Human Beings—*Amer J Med Sci* 1939
July Vol. 188 No 1 pp 40-41

The value of synthetic nicotinic acid thiamin hydrochloride and riboflavin may now be regarded as established in pellagra and other conditions of vitamin deficiency Professor Spies has now treated in the same way 50 patients with ocular symptoms—burning itching dryness photophobia in sunlight some degree of granulation difficulty in reading from a film over the eyes. Great improvement disappearance of photophobia and burning amelioration of general health has followed the daily administration of vitamin A as carotene in oil in amounts ranging between 10 000 and 50 000 units.

H H S

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES XXXV *

HALLAY¹ recommends a novel but simple treatment for surface ocular inflammations due to infection viz. the application of soap lather This is said to act as a buffer and restore the acid base balance in the infected area. Some smarting is naturally experienced and several applications may be required unless the infection is a very recent one

Trachoma—POLEFF² has given a further account with microphotographs of his researches into the tissue-culture of trachoma [see this *Bulletin* 1939 Vol. 36 p 856] From his observations he concludes that the parasitic atoms probably belong to the class of ultraviruses and that the Rickettsia like corpuscles described by BUSACA and CUENOD are identical with Halberstaedter Prowazek inclusions The incidence of trachoma in countries commonly considered to be non trachomatous was the subject of a discussion at the International Organization against Trachoma.³ LAVERY stated that in Ireland the disease is rare amongst the well-to-do. Some of the orphanages are rather heavily infected. One large institution was badly infected eight years ago but owing to improved hygiene is to-day entirely free.

* For the 34th of this series see Vol. 36, pp 855-857

¹ HALLAY (L. T) Oligoseptic Treatment of Ocular Infection.—*Amer J Ophthalm* 1939 Sept. Vol. 22 No. 9 pp. 1012-1014

² POLEFF (L.) Culture *in vitro* of the Corpuscles of Trachoma.—*Brit J Ophthalm* 1939 Nov Vol. 23 No. 11 pp. 730-740. With 5 figs.

³ REVUE INTERNATIONALE DU TRACHOME, 1939 July Vol. 16, No. 3, pp 157-173—International Organization against Trachoma. Annual Meeting April 21st, 1939 Communications from Dr F J LAVERY (Ireland) Dr HARRY GRADLE (United States) ARNOLD SOMMER (England) Dr W ROHRSCHEIDER (Germany) Paul J PETIT (France) and others.

A similar institution, however which lacks adequate facilities for open-air recreation shows no improvement despite every attention to hygiene. Foci of the disease exist amongst the general population in some of the rural districts these seem to affect families and the infection does not spread to the schools. It is suggested that this is due to the fact that the schools are unprovided with washing facilities so that there is no community washing. In the year 1937 thirty-five cases were detected amongst 18,883 school-children examined, and the following year sixty amongst 21,924. Acute trachoma does not occur but phlyctenular ophthalmia is a common complication. GRADLE estimated that at least 35 000 non-Indians and 25 000 Indians in the U.S.A. were trachomatous. The Indian tribes in the south-west are those chiefly affected. As regards London SOREBY has noticed steady amelioration owing to the excellent municipal services provided. He considers that unilateral infections are not rare, and has failed to find nasal sepsis a factor in such cases. ROHRSCHEIDER stated that in Germany the disease was endemic in a few districts only—the mostly be on the eastern frontier and the poorer classes are the chief sufferers. Trachomatous areas frequently are comparatively loose-fre. RADLO and ROSTKOWSKI⁴ in view of the supposed virus causation of trachoma studied the Weil-Felix and the Weigl reactions in 320 trachomatous subjects and found the former negative in 92 per cent and the latter negative in 88 per cent. This compares with 94 per cent and 87 per cent respectively in 205 non-trachomatous controls.

BURDET CULVON and NATAR⁵ write with much enthusiasm of their success in the treatment of trachoma by a new preparation (sulphamide (azogue sulfamide No 33). Struck by its efficacy in experimental lymphogranuloma, the authors thought it might prove equally successful in trachoma. They employed doses of 0.5 gm. four or five times daily by the mouth, and from 1 to 1.5 cc. of a one per cent solution for subconjunctival injection. Oral therapy alone however has been found quite efficacious and injections are unnecessary. Corneal lesions respond in a few days, but conjunctival improvement is less rapid and may not set in until sixty or seventy grammes of the drug have been taken. Once the improvement has started the treatment should be continued intermittently.

Cornes—RHODES⁶ has investigated the bacteriology of hypopyon ulcer seen in 120 patients at the Eye Department of the Royal Infirmary, Edinburgh. No fewer than 67 per cent of these were miners. The investigation brought out two noticeable features, firstly in 21.6 per cent the cultures proved negative, and secondly in only 11.6 per cent were pneumococci found. The organisms most commonly isolated were diphtheroid bacilli and *Staphylococcus albus*; these of course are not necessarily pathogenic. The observer concludes that the result of his investigation tends to minimize the purely infective element in hypopyon ulcer and that three variable factors in its causation must be considered: (1) the bacterial flora of the

⁴ RADLO (Pierre) & ROSTKOWSKI (Louis). Recherches sérologiques du trachome — *Rev. Internat. du Trachome* 1939, July, Vol 16, No 3, pp 125-135.

BURDET (Et) CULVON (A.) & NATAR (R.). Chimiothérapie du trachome par l'azogue sulfamide No 33 — *Bull. Acad. Méd.* 1939, Oct. 17 & 24, 103rd Year, 3rd Ser., Vol 122, No 30, pp 330-342.

RHODES (A. J.). Studies on the Bacteriology of Hypopyon Ulcer — *Brit. J. Ophthalm.* 1939, Sept., Vol 23, No 9, pp 627-631.

conjunctival sac of the traumatized eye (2) the nature of the traumatizing particle (3) the resistance of the corneal tissue to infection [The reviewer's experience in Madras led him to believe that there the two most important factors were the presence of pneumococci and depreciated general health. Slight trauma was sufficient to cause an ulcer if these factors existed. In a high percentage of cases infection was derived from the lachrymal sac.] KIRWAN⁷ has reported a case of corneal grafting in which normal vision was obtained in an eye blind from interstitial keratitis. The diameter of the graft was 4.5 mm. and that of the trephine hole in the recipient's cornea was 4.75 mm. The graft was kept in place by two fine silk cross sutures, one arranged in the form of a cross and the other in the form of an \. The sutures were passed through the opaque cornea adjacent to the site of the graft but did not perforate the cornea. They were removed on the fifth day. Seven months after the operation vision was 6/6. Eyes of donors blind from glaucoma furnish good grafts and it is unnecessary to choose a donor of the correct blood group.

Filariasis.—McMULLEN⁸ has observed *Microfilariae bancrofti* in the aqueous humour of a Hindu student aged 25 living in London. The parasites were first detected in the left eye after a somewhat persistent uveitis had subsided. Six months later the right eye was attacked and a number of microfilariae appeared in the anterior chamber when the eye had quieted. The parasites were never seen during the acute phase of an attack. Fair numbers of *Microfilariae bancrofti* were present in the patient's peripheral circulation at night, but other signs of filariasis were absent. The question arose whether the organisms were the actual cause of the uveitis or whether the inflammation was responsible for their appearance in the eyes. McMullen very plausibly suggested that microfilariae may often be present at night in the aqueous of infected persons with otherwise normal eyes. They disappear however in the daytime or when the eye is brightly illuminated for examination. LEVY⁹ has reported a case of *onchocercal keratitis* and *cyclitis* in a European resident for ten years in Kenya. Trouble commenced with a persistent chronic conjunctivitis and two years later an established keratitis and cyclitis was found. The corneal infiltration lay at different levels in the substantia. Small foci occurred in the periphery and these coalesced and formed larger plaques. A large area in the centre of the cornea was affected. Heavy keratic precipitates were present but the iris appeared to be quite healthy. Persistent and troublesome photophobia was a marked feature. No microfilariae were seen nor were there any of the usual subcutaneous nodules. Indeed a high eosinophilia seems to have been the only indication of filarial infection.

Steady progress is recorded in the Twenty-fifth Annual Report of the Ophthalmic Hospital Section of the Egyptian Government

⁷ KIRWAN (E. O'G.) Transplantation of the Cornea.—*Arch. Ophthalmol.* 1939 July Vol. 22, pp. 21-24. With 2 figs.

⁸ McMULLEN (W. H.) Ocular Filariasis.—*Trans. Ophthalm. Soc. United Kingdom* 1939 Vol. 59 Pt. 2, pp. 487-501. [15 refs.]

⁹ LEVY (A. H.) A Case of Bilateral Keratitis and Cyclitis due to Filaria (*Onchocerca volvulus*) Infection in a European from Kenya.—*Proc. Roy. Soc. Med.* 1939 Oct. Vol. 32, No. 12, pp. 1620-1621 (Sect. Ophthalmology pp. 80-81.)

for the year 1937²² The rate of increase in new patients was 7 per cent. and these reached a total of 1,213,781 5.8 per cent. of those seeking advice were blind in one or both eyes. Acute ophthalmia was the cause in 80 per cent and the gonococcus was the chief cause of acute ophthalmia. Ninety-nine per cent. of school-children were found to suffer from trachoma in some form. *H Kirkpatrick.*

²² EGYPT. MINISTRY OF PUBLIC HEALTH. Ophthalmic Hospitals Section. Twenty-Fifth Annual Report of the Ophthalmic Hospital Section for 1937—47 pp. With 1 folding map & 1 folding chart 1939 Cairo Al-Ettemad Press [P T 10]

MALARIA

and SCHNEIDER (p 457) discuss the dysgonic action of rhodoprae quine which in three daily 3 cgm doses after about nine paroxysms of induced malaria arrests the attacks for a time. Further paroxysms occur later, after which the parasites lose the power to segment and the infection remains latent for some months DE SOUSA (p 458) reports on Quinarsol in treatment

BARROWMAN (p 458) shows that the effective life of two drainage pipe lines laid one above the other in the vicinity of trees is more than six times that of the usual single line. GIACOBBE (p 458) writes of the success of the programme of levelling Paris green and oil application in controlling malaria in Carbonia Sardinia.

DECOURT *et al* (p 458) show that in fowls infected with *P gallinaceum* there occurs a phase when after being infective the blood though still containing parasites is non infective to other fowls UNGO-MUGDAN (p 459) shows that the Feulgen nuclear reaction is positive only in mature schizonts of *P gallinaceum* CHORTIS (p 459) considers that in *P gallinaceum* infections exoerythrocytic schizonts are the result of imperfect phagocytic action of the endothelial cells which allows the ingested forms to develop instead of destroying them

RODHAIN and LASSMAN (p 459) conclude from their investigations that *P vivax* and *P gonderi* show a definite preference for immature erythrocytes which is absent in *P falciparum* *P reichenowi* *P knowlesi* and *P cynomolgi* C II

DUNCAN (David) His Majesty's Naval Base, Singapore—Its Medical Aspects—*Jl Roy Nav Med Serv* 1939 Oct Vol. 25 No 4 pp 394-411 With 6 figs. 1 diagram 5 charts & 1 map

This is an interesting though somewhat discursive account of some of the medical and sanitary problems that have been successfully surmounted during the construction of the Singapore naval base. It contains an account of the vectors of malaria encountered and of the methods of control adopted The effect of tropical climates on health and efficiency is discussed as are the attractions and drawbacks of service in the tropics There is a good description of the Cameron Highlands a Malayan hill-station in process of development, which promises to confer great benefit on Europeans serving in this part of the Far East The article will be of special interest to naval Medical Officers who are likely to be appointed for duty in Singapore

Norman White

JAKUSHEVA (A I) Types des courbes de la fréquence du paludisme et la relation entre le nombre de cas initiaux printaniers et la fréquence automnale de l'année précédente (Types of Malaria Incidence Curves and the Relation between the Number of Primary Spring Cases and the Autumnal Prevalence during the Previous Year)—*Med Parasit & Parasitic Dis* Moscow 1939 Vol 8 No 3 [In Russian pp 287-288 With 13 figs. [36 refs.] French summary p 287]

In the USSR there are two main types of malaria incidence curve a northern type with a spring-summer maximum and a southern type in which the maximum incidence is in the summer-autumn with a slight rise in the spring An intermediate type of curve also occurs.

In the north more than half the total cases occur in the first half of the year even up to 75 per cent. in exceptional years. Only some 30 per cent. of the cases occurring in the first half of the year are relapses, the remainder being primary infections with prolonged incubation. Any increase in the number of *P. vivax* infections in the summer and autumn is only made manifest the following spring in the north and central parts of the USSR.

In the south of the country cases of prolonged incubation are of rare occurrence the spring rise in the incidence curve is caused by relapses. A thorough treatment of these relapses should have beneficial effect on the summer incidence by diminishing the infection rate of anophelines.

In the north and centre spring relapses also call for thorough treatment but more effective still would it be to find a means of detecting individuals undergoing prolonged incubations and submitting them to appropriate treatment before the spring rise materializes.

N IV

PANSINI (Giuliano). La malaria dei lavoratori reduci dall'Africa Orientale [Malaria of Manual Labourers repatriated from East Africa].—*Rassegna Sociale d. Africa Italiana*. Rome. 1939 June Vol 2 No 6. pp. 710-720

This is a discussion in somewhat general terms of malaria in Italian East Africa, based on the large experience of the Hospital in Aversa which was created for the benefit of the manual worker invalided home. Of the 7400 patients admitted into that institution between September 1937 and October 1938 sufferers from malaria numbered 3,600. Emphasis is laid on the very wide diffusion of malaria throughout the territory. Places at high altitudes are not exempt. A table is given of twelve localities situated at heights varying from 1,028 to 2,900 metres at which primary infections of malaria have been acquired.

The cases treated in the hospital were nearly all relapses, the primary infection having been acquired at varying, often very considerable, periods before admission. The preponderance of *P. vivax* infections is noteworthy. Of the 478 patients in whom parasites were found 81 per cent. harboured *P. vivax* the remainder *P. falciparum*. Double infections were rare, 1 per cent. Many of the patients had been taking prophylactic quinine when first attacked, some of them apparently in regular and in what is generally regarded as sufficient doses. The very large majority of patients are discharged from hospital at Aversa fit for work the institution is thus doing a work of very great social importance.

The cases were not of outstanding severity. The few cases that displayed unusual symptoms have been described elsewhere in the literature.

N IV

CORRADETTI (Augusto). Ricerche sulla malaria nella *Dancalia meridionale* [Malaria in Southern Dancalia].—*Rivista di Malariologia*. Ser. I 1939 Vol. 18. No. 4 pp. 249-255. With 5 figs (1 map) on 3 plates (1 folding). English summary.

This is an account of observations made along the trade route which runs from Assab a port on the Red Sea in Eritrea, to Bati

The route runs south west to the north of the River Auaso and crosses several tributaries of that river. Malaria incidence is high during the dry season in the neighbourhood of perennial streams and throughout the territory during the rains. A total of 3 423 persons was examined the average parasite rate was 9.8 per cent. The infection rates according to race were Dancahs 3 Sudanese 6, Arabs 9.6 Italians 13.8 Somalis 14.5 and Abyssinians 18.6 per cent. It is concluded that the race best adapted for labour forces in this territory is the Sudanese the Dancahs are nomads and but little adapted to labour. *P. falciparum* infections formed 56.8 per cent of the total the remainder being *P. vivax* infections. *P. malariae* was not found. The chief malaria vector throughout the area is *A. gambiae* 4 *pharoensis*, *A. pretoriensis* and *A. dancahensis* n. sp. were also found. N W

MOSCA (Ezio) Sulla malaria indotta da *Plasmodium simmaculatum* ceppo etiopico e ceppo campagna romana [Malaria induced with Ethiopian and Roman Campagna Strains of *P. falciparum*].—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol. 2. Pt. 2. pp. 489–502. With 10 charts.

Four patients were inoculated intramuscularly with citrated blood infected with an Ethiopian strain of *P. falciparum* and four other patients similarly infected with a Roman Campagna strain. No appreciable difference was noted between the two strains with regard either to the incubation period or to their capacity of infecting *A. maculipennis* var. *atroparvus* or to their morphology. Febrile attacks provoked by the Roman strain were more prolonged and the symptoms were more severe. There is less liability to relapse in infections with the Ethiopian strain. The Ethiopian strain is much more amenable to quinine therapy [see also this *Bulletin* 1939 Vol. 36 p. 819]. N W

LEXSON (H. S.) Longevity of *Anopheles maculipennis* race *atroparvus* Van Thiel, at Controlled Temperature and Humidity after One Blood Meal.—*Bull. Entom. Res.* 1939 Nov. Vol. 30 Pt. 3 pp. 295–301. With 2 figs.

The author has exposed adult *Anopheles maculipennis* race *atroparvus* to controlled climatic conditions and records the length of life of females which have received one blood meal and of others which have not been fed.

The material used in these experiments had been bred in London for a number of generations. In spite of the use of a standardized technique the author discovered that there were large differences between different batches of mosquitoes. These differences may be seasonal but that is not proved. The female is generally willing to take her first blood meal on the second day and is thereafter maintained at 25°C and a controlled humidity until death. It is found that the moths live longer the higher the humidity (and that the same is true of *Culex fatigans*). This point may seem obvious but it has not previously been studied with care. At the highest humidity 90 per cent the mean life of the female was 8.3 days and the maximum 14

Facts are also given on the survival of males and females which have not been fed the proportion of females which took blood, and the proportion of the sexes among the mosquitoes which were bred.

P A Buxton.

LEWIS (D J) The Seasonal and Geographical Distribution of *Anopheles maculipennis* in Albania.—*Riv di Malariologia* Sez I 1939 Vol 18 No. 4 pp. 237-249. With 5 text figs. & 4 figs on 2 plates

In Albania three varieties of *A. maculipennis* have been distinguished, *A. m. typicus*, *A. m. subalpinus*, *A. m. messicus* and *A. sacharovi*. Marked seasonal changes in the relative frequency of the different forms occur. In summer the eggs of these four varieties conform to their usual appearance but in spring and autumn many eggs of the first three named varieties cannot be identified with certainty. Eggs of *typicus* are paler in summer than in spring. In the cold weather of early spring and of late autumn the eggs of each variety tend to be darker and the three forms of barred eggs resemble one another closely.

In autumn *A. maculipennis* and *A. sacharovi* leave wattle stables for stone buildings. *typicus* often enters hollow trees. *A. sacharovi* breeds chiefly in brackish water and is rarely found far from the coast. It hibernates less completely than does *A. maculipennis* and it enters stone buildings a month later. It exhibits a certain degree of gonotrophic dimorphism. If malaria transmission takes place during winter and early spring *A. sacharovi* might be an efficient vector. *A. m. typicus* lays eggs in many types of water. *subalpinus* and *messicus* show a marked preference for marshes. *A. sacharovi* relatively high water temperature or some other factor dependent on scarcity of shade appears to favour a high rate of emergence in *subalpinus*. The temperature of water appears to be of little importance as a factor determining the selection of a site for egg-laying, of any variety.

V II

VAN THIEL (P H) in collaboration with J REUTER J SAUTET & L BEVERE On Zoophilism and Anthropophilism of *Anopheles* Biotypes and Species.—*Acta Leidensia (Scholas Med Tropicae)* 1939. Vol 14 pp. 240-276. With 6 figs. [27 refs.]

BARROWMAN (Barclay) Replanting and Malaria.—*Jl Malaya Branch Brit Med Assoc* 1939 Sept Vol 3 No 2 pp. 170-174

This circular was written for the benefit of rubber planters in Malaya, to whom it should be of very great service. Increased malaria resulting from replanting is caused not only by procedures which encourage increased breeding of the mosquito carrier but also by procedures which disturb its usual habits. As an example of the latter clearing may well result in the removal of attractive resting-places for *A. maculatus* from the neighbourhood of dwellings. The dwelling itself may then be used as a resting-place. The author states that extended flights of anophelines take place often, if not always, into subsoil-drained or other areas in which there is no actively repellent factor in the control, e.g. oiling. The manner in which replanting creates additional collections of surface water is described as are the ways and means of dealing with them.

A II

VENHUIS (W G) Voorloopige entomologische mededeelingen omtrent *An barbirostris* van Celebes. [Preliminary Entomological Communication on *A barbirostris* in the Celebes.]—*Geneesk Tijdschr v Nederl Indië* 1839 Oct 3. Vol 79 No. 40 pp 2515-2519 English summary

"The *An barbirostris* from several places in Celebes is morphologically very near to *An barb typ* from Java.

However some differences were observed the most outstanding of them being the fact, that in the Celebes form the white tarsal band between the 3rd and 4th tarsal segment is very narrow and only formed by white scales on the apical part of the 3rd tarsal segment, whereas in *An barb typ* from Java the band is usually a little broader while the basal part of the 4th tarsal segment is white as well.

In the larva from Celebes the number of branches of several hairs is a little smaller than in Java, but a good difference for practical use has not yet been found

It is very interesting that the anal gills in the larva from Malekoo (Celebes) are very much longer than in Java. The length of these gills of the larvae from other places lies between these two extremes. There seems to be no correlation with the amount of chlorine in the breeding places.

In view of the great difference in feeding habits between the forms from Java and Celebes, so that the *An barbirostris typ* from Java lives almost as a wild species and was never found infected, whereas the one from Celebes is easily captured in great numbers in houses and proved to be infected for 13.3 per cent out of over 500 dissections, I am inclined to consider the Celebes form of *An barbirostris typicus* as different from the Java form. For the name of the Celebes variety *vanus* ought to be chosen, because of the old name *An oswus* given in 1860 by Walker to a mosquito captured at Makassar (Celebes) and which usually is considered to be a specimen of *An barbirostris*.

Some slight differences were observed between the *An barbirostris* from different places in Celebes.

When the entomological work on this interesting material is completed the subject will be treated more in detail

ROCCHI (Filippo) Valore antigeno del pigmento malarico [Antigenic Power of Malaria Pigment.]—*Riv di Malarologia* Sez. I 1939 Vol. 18. No 4 pp 225-236 English summary

The malaria pigment used by the author in his experiments was obtained from two spleens one from a man who died from malignant tertian malaria, the other a large spleen removed by splenectomy from a patient with chronic malaria. The method used for the isolation of the pigment is described in detail. For skin reactions the pigment was dissolved in a solvent composed of a saturated solution of lithium carbonate 1.3 parts physiological salt solution 10 parts. Injected intradermally into the skin of a rabbit a large maculo-papule results some three hours later and persists for about six hours. Eight rabbits which gave this positive reaction received on alternate days intravenous injections each of 0.5 cc. of the pigment solution. Every fourth day the intradermal test was repeated. In each case after the 5th or 6th injection the intradermal reaction became negative and remained so for many days. The serum of such rabbits gave a positive flocculation test the solution of malaria pigment being used as an antigen. Intradermal tests on man give similar results. Malaria pigment used as an antigen in Henry's reaction was used with success.

Malaria pigment is soluble in plasma. On the basis of these observation the author considers the antigenic power of malaria pigment a established
N 17

HUTTON (E. L.) & SHUTE (P. G.) The Risk of transmitting Malaria by Blood Transfusion.—*Jl Trop Med & Hyg* 1939 Oct. 16 Vol 42 No 20 pp 309-312.

The authors remarks on the risk of transmitting malaria by blood transfusion are based for the most part on their observations on malaria induced by infected mosquitoes. *P. vivax* may persist in the blood for 18 months after the primary infection *P. falciparum* for at least 12 months and *P. malariae* for many years. Latent cases of malaria cannot be diagnosed with certainty by any known method. Persons in apparent good health may harbour parasites in sufficient quantity to transmit malaria if they serve as donors for blood transfusion. Persons who have lived in areas in which malaria is endemic should not be used as donors if others are available. If such persons must be used as donors the risk of their blood transmitting malaria may be much lessened if they take quinine ten grains a week, regularly. Keeping the donor's blood for days, or even weeks, at low temperatures, will not destroy the Plasmodia it may contain.
N 11

GRIG (E. D. W.) & NEILL (Alexander) Observations on the Incubation Period in Cases of Induced Malaria.—*Jl Trop Med & Hyg* 1939 Nov 1 Vol 42 No 21 pp 325-328. With 5 charts

The observations concern cases of malaria in which infection was induced by the inoculation of parasites by the intravenous intramuscular or subcutaneous routes. The incubation period is the interval between the inoculation and the first appearance of parasites in the peripheral blood. In 144 *P. vivax* infections the incubation period varied from 2 to 24 days, average 8.8 days. The incubation period was shortened considerably when the parasites were introduced intravenously. This is a point of practical importance in malaria therapy. Intravenous injection did not affect any of the 84 patients injuriously. The number of parasites in the blood of the donor does not appear to be correlated with the length of the incubation period. Nine cases were inoculated with *P. malariae*. The average incubation period was 14.1 days. Here again the number of parasites injected was not correlated with the duration of the incubation period. Fifteen cases were inoculated with *P. knowlesi*. Incubation periods varied from 3 to 20 days average 7.6 days. In three cases infection failed to materialize.
N 11

BOSE (Indu Bhusan) MUKERJI (B.) & CHOPRA (R. N.) Quality of Quinine Preparations in Indian Hospitals and Dispensaries.—*Indian Med Gaz.* 1939 Oct. Vol 74 No 10 pp 609-613.

One hundred samples of "quinine mixtures" were analysed. 64 of these showed a deficiency of quinine. 16 contained more quinine than they should have done. Of forty samples of quinine tablets, both Indian and foreign half had a deficient quinine content. Of 28 samples of quinine sulphate, febrifuge powders, etc. 13 were below standard. Quinine sulphate powders contained adulterants. The

investigation reveals a very unsatisfactory state of affairs which appears to justify the authors demand for some form of State control. The matter is one of great public health importance N W

PIORKOWSKI (F O) Agranulocytosis after Atebrin Treatment.—
East African Med J 1939 Sept. Vol. 16 No 6 pp 227-231

A woman with a long history of many diseases including malaria was operated on for a purulent discharge of the antrum. After the operation a sudden rise of temperature was thought to have been possibly due to a relapse of malaria and the patient received an intra muscular injection of atebrin 0.3 gm. on each of two successive days and the same dose by mouth on each of the next two days. Phenacetin was given to relieve persistent headache. the patient was accustomed to take this drug in considerable quantities as well as veramon. The patient's condition grew worse and on the 7th day after the operation the diagnosis of agranulocytosis was made. The number of white cells was only 2 100 per c.mm. 86 per cent. of which were lymphocytes and 14 per cent monocytes. There was a complete absence of granulocytes. Under treatment with sodium pentnucleotide the patient eventually recovered. The author considers it probable that a prolonged use of phenacetin and veramon was the primary cause of the agranulocytosis and that the shock of operation and the following atebrin treatment aggravated the condition. N W

MOLLARET (P) & SCHNEIDER (J) Une nouvelle méthode d'unpaludation thérapeutique. L'impaludation en deux temps sans réinoculation mals avec apyrexie intermédiaire et récurrence ultérieure réglables à volonté [A New Method of applying Malaria therapeutically]—*Bull et Mém Soc Méd Hôpiti de Paris* 1940 Jan. 3 55th Year 3rd Ser No 27 pp 1336-1339 [Summary appears also in *Bulletin of Hygiene*]

The method suggested is the outcome of work carried on regarding the action of synthetic drugs essentially gametocide on *P. vivax*. The drug which in the authors hands has given constant results is a mixture in equal parts of praequine (6-methoxy-8-diethylamine-isopentyl-amino-quinoline) and rhodoquine (the same except that propyl replaces isopentyl) they call the combination rhodopraequine and administer it subcutaneously. They find that injection of 3 cgm. on three consecutive days after the usual series of paroxysms—nine as a rule—arrests these except for one single mild attack which may follow. There succeeds an apyrexial period during which no parasites—gametocytes or schizonts—can be found in the blood but they have not been destroyed entirely for attacks will return spontaneously, or may be provoked by injection of 20 cc. of the patient's own blood. Parasites reappear in the blood at first schizonts later sexual forms after 3 or 4 attacks the fever spontaneously comes to an end and say the authors the schizonts have lost all ability to segment and the drug has a dysgonic action [see this *Bulletin* 1939 Vol. 36 p 496]. After the second apyrexia the patient enters the chronic malarial state the parasites persist in his blood but he suffers from no malaria attacks spontaneous or induced, and this condition persists for 6 months at least during which his blood if injected into a fresh subject will give rise to typical malaria attacks H H S

DE SOUSA (Menino) Recent Advances in Malarial Therapy—*Med. Bull. Bombay* 1939 Oct. 7 Vol. 7 No. 19 pp. 599-601

The author reports good results in the treatment of 30 cases of malaria, both tertian and subtertian, with a proprietary preparation called "qumarsol". This is stated to be quinophenyl-dimethyl-pyrazolone-sodium dimethylarsenacum. The dose given was three tablets a day for four days and one tablet a day for the succeeding ten days. [There were no control patients treated with the more usual quinine salts, and no comparative estimate of the value of this drug can therefore be made.] N IV

BARROWMAN (Barclay) An Expedient in Antimalarial Subsoil Drainage.—*Jl. Malaya Branch Brit. Med. Assoc.* 1939 Sept. Vol. 3 No. 2 pp. 175-176.

When subsoil pipes are laid near trees they are apt to get choked by roots of trees. In such circumstances it is effective to lay two pipe lines one above the other. In the dry weather such water flow as there may be will be confined to the lower line of pipes. This may become blocked eventually and there will be but a single pipe line functioning. Experience has shown, however, that the effective life of the double line is more than six times longer than that of the usual single line of pipes. In suitable open soils fascine drainage is another alternative for draining soil near trees. N IV

GIACOBRE (Marco) La lotta contro la malaria durante la costruzione della città di Carbonia. (Anti-Malaria Campaign during the Construction of the Town of Carbonia, Sardinia.)—*Riv. di Malariologia* Sez. I 1939 Vol. 18 No. 4 pp. 256-275. With 2 figs. English summary.

This is a detailed account of the measures that have been taken to control malaria during the construction of the new town of Carbonia. The measures were comprehensive and crowned with success. During nine months from January to September there were 882 cases of malaria; only ten of these were believed to be primary cases, the remainder being relapses. The author considers that success was in large measure due to larval control, levelling, Paris green and oil.

N IV

DÉCOURT (Philippe) SCHWEIDER (Jean) & KERREST-GROSODIER. Disparition du pouvoir infectant du sang pendant la phase descendante de l'infestation par *Plasmodium gallinaceum*. [Disappearance of Infective Power of the Blood during Declining Phase of *P. gallinaceum* Infection.]—*C. R. Soc. Biol.* 1939 Vol. 131 No. 22 pp. 1193-1195.

By taking blood daily from fowls inoculated intraperitoneally with blood containing *Plasmodium gallinaceum* and inoculating it into other fowls the authors have shown that the malarial infection has four phases. During the first phase of four or five days' duration the blood of an inoculated fowl is non-infective to other fowls and contains no detectable parasites. In the second phase parasites appear in the blood, which is now infective. After the crisis the parasites begin to decrease.

in number and the third phase is reached. The point of the paper is to note that during the third phase though parasites are present in the blood it is non infective. Following this a fourth phase is reached, during which the blood is again infective though the number of parasites present may be very small indeed. After this there intervene short non-infective periods from time to time C M Wenyon

UNGO-MUGDAN (Armida) La reazione nucleare di Feulgen negli stadi [? endo-] e exo-eritrocitici del *P. gallinaceum* Brumpt (1935) [Feulgen Nuclear Reaction in the (Erythrocytic) and Exo-erythrocytic Stages of *P. gallinaceum*].—*Rendiconti Istituto di Sanità Pubblica* Rome. 1939 Vol. 2. Pt. 2. pp 573-574 With 2 coloured figs. on 1 plate.

The author has tested the Feulgen reaction in various stages of development of *Plasmodium gallinaceum*. The only stages in which it was positive were the mature schizonts both endo- and exo-erythrocytic forms. In a coloured plate is shown the appearance of both these forms when stained according to the Feulgen technique.

C M W

CHORTIS (Panaiotis) Sulle alterazioni del sistema reticolo endoteliale nelle infezioni da *Plasmodium gallinaceum*. [Changes in the Reticulo-endothelial System in *P. gallinaceum* Infections].—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol. 2. Pt. 2. pp 445-452. With 2 plates (1 coloured)

The author notes that in acute *Plasmodium gallinaceum* infections in fowls there is a marked proliferation of the reticulo-endothelial system. Fowls die of anaemia which is the result of active destruction of red blood corpuscles by the parasites. If an infection becomes chronic in fowls which recover from the acute infection without quinine treatment the same reaction of the reticulo-endothelial system is observed. The anaemia developed during the acute phase persists as a result of a failure of the blood forming function. The same type of anaemia is observed in cases in which quinine is administered during the acute phase but in this case there is no marked reaction on the part of the reticulo-endothelial system. It is concluded that the exoerythrocytic schizonts are the result of an imperfect phagocytic action of the endothelial cells which allows the ingested forms to develop instead of destroying them. These forms are thus to be regarded as accidental and in no way essential stages of development.

C M W

RODHAIN (J) & LASSMAN (P) Au sujet du comportement différent de divers plasmodiums de mammifères vis-à-vis des réticulocytes. [Differing Behaviour of Various Plasmodia of Mammals with Regard to the Reticulocytes].—*Ann. Soc. Bde de Méd. Trop* 1939 Sept 30 Vol. 19 No 3 pp 423-444 With 4 figs. on 1 plate [23 refs.]

The authors have examined the blood of human beings suffering from *Plasmodium falciparum* and *P. vivax* infections and of monkeys or chimpanzees harbouring *P. reichenowi*, *P. knowlesi*, *P. cynomolgi* and *P. gonderi* from the point of view of the relative numbers of mature and immature erythrocytes infected. In the case of *P. vivax* in man

and *P. gondersi* in the monkey it was found that from 49 to 248 per thousand of reticulocytes were infected, while with the other parasites never more than 2 per thousand were infected. It is concluded that the young forms of *P. vivax* and *P. gondersi* reveal a definite preference for the immature erythrocytes in spite of the fact that SIMONS in a recent publication has raised objections of a mathematical nature to the conclusions based on observations of the kind which the paper under review describes

C. M. W.

ERRATUM.

In the summary of the discussion on the paper by CHRISTOPHERS entitled *Malaria in War* this *Bulletin* 1940 Vol. 37 p. 174 it is reported that WHITTINGHAM (p. 175) advised the use of methylated spirit in preparing Leishman's stain. This was an error in the original account of the discussion. For methylated spirit read methyl alcohol.

VENOMS AND ANTIVENENES.

PRELIS OF ABSTRACTS IN THIS SECTION.

MAIER (p. 461) shows that a substance having the trade name Zephiran is an efficient agent for the preservation of toxicity when mixed with venom. DE (p. 461) gives a method for purifying the haemolysate fraction of the venom of *N. naja*. BOQUET (p. 461) gives further details of work on the detoxification of venom by solutions of copper sulphate in the presence of hydrogen peroxide, in this case using the venom of *N. tripudians*.

OH (p. 462) has investigated the effect of common Formosan snake venoms on blood coagulation *in vitro* and *in vivo*. CHSANG and BOQUET (p. 462) point out the differences between the colourless venom of *V. aspis* from the Department of Gers and the yellow venom found in the same species from other districts.

In discussing the mechanism of the hypotension resulting from injection of cobra venom, GAUTRELET (p. 463) concludes that the action is on the capillaries and coincides with the liberation of histamine. BERTRAND and VLADESCO (p. 463) show that in animals a degree of hyperglycaemia follows the injection of lethal doses of cobra venom. They (p. 463) found the same effect in venoms of both *Viperidae* and *Coleubridae* and consider that the fraction responsible for this effect is probably distinct from the toxic fraction.

RUTHERFORD (p. 464) reports on the relief of pain following the use of cobra venom, which acts specifically on the pain centres of the cerebrum.

PONNAMMALAM (p. 464) describes a fatal case of krait poisoning.

JÖRG (p. 464) describes poisoning by *Bothrops* and details the treatment he advises. Suction methods are emphasized. CHOPRA and CHOWHAN (p. 466) draw attention to shock due to fear in cases of snake bite. Details of early and late treatment are given with emphasis on suction methods and artificial respiration in the former. ALLEN (p. 466) reports experiments on the local treatment of experimental snake bite in animals and concludes that the Jackson method of multiple incisions and suction is that of choice.

GITHENS and WOLFF (p 467) show that certain antigenic components are common to many venoms and to obtain a satisfactory polyvalent antivenene against the common N American pit vipers one venom from each of three groups mentioned is necessary. There appear to be two distinct neurotoxins in pit viper venoms one acting on the respiratory apparatus and the other on the voluntary muscles of the body. CÉSARI and BOQUET (p 467) report satisfactory production of antivenene in rabbits immunized with the venom of *V. aspis* to which formalin had been added (anavenin) C II

MAIER (Eugene) Preservation of Biological Fluids (Bacteriophage Vaccines and Venom Solutions) with Alkyl-Dimethyl-Benzyl-Ammonium-Chloride.—*Jl Bacteriology* 1939 July Vol. 38. No 1 pp 33-39 With 2 figs

Many snake venoms when kept for experimental work are very unstable being affected seriously by heat and rapidly losing potency even at room temperature. The author has apparently found a solution of the difficulty. A compound having the trade name of Zephiran and with a chemical composition alkyl-dimethyl benzyl-ammonium chloride added to venom to make a final strength of 1 in 50 000—the venom being obtained freshly then frozen and dried rapidly *in vacuo* over sulphuric acid—caused no loss of toxicity of rattlesnake or moccasin venom when it was tested on mice after six months.

The same concentration (1 in 50 000) was found equally serviceable in the cases of bacteriophage and autogenous vaccines. H H S

DE (S S) Studies on Haemolysin of Cobra Venom. Part I Investigations on the Isolation of Haemolysin from Cobra (*Naja naja*) Venom.—*Indian Jl Med Res* 1939 Oct Vol. 27 No. 2. pp. 531-536. [10 refs.]

The author gives details of two methods of purifying the haemolysin fraction of the venom of *Naja naja*. The first consists of precipitation with methyl alcohol, fractional precipitation with acetone and removal of the inert proteins by adsorption on ferric hydroxide gel. The second consists of precipitation with 20 per cent sodium chloride solution redissolving the precipitate in water precipitation with metaphosphoric acid and extraction with cold pyridine.

By both methods an eleven fold concentration of the haemolysin was obtained. The details of the procedures cannot satisfactorily be abstracted and should be consulted in the original. C IV

BOQUET (Paul) Sur le rôle de quantités infinitésimales de cuivre dans l'atténuation du venin de cobra (*Naja tripudians*) par l'eau oxygénée [The Role of Small Quantities of Copper in the Attenuation of the Venom of *Naja tripudians*].—*C R Soc Biol* 1939 Vol 131 No 22. pp 1207-1209 With 1 fig

In previous notes the author [this *Bulletin* 1939 Vol. 36 p 860] has shown that viperine venom exposed to the action of hydrogen peroxide in the presence of minute quantities of copper in the form of copper sulphate is rendered non-toxic in a few hours at 37°C. The venom of the cobra *Naja tripudians* was similarly investigated and was found to lose virulence in the same manner but more slowly.

The rapidity with which virulence is lost as in the case of viperine venom is in proportion to the amount of oxygen available and the concentration of copper sulphate used. With a concentration of 5 mgm copper per litre, a dilution of H_2O_2 (100 volumes) 1/1600 detoxicated the venom in 4 days with 2.5 mgm. copper H_2O_2 1/1200 detoxicated in 8 days and with 1.0 mgm. copper H_2O_2 1/800 detoxicated in 8 days. In the absence of copper hydrogen peroxide has no detoxicating action within 4 days, but from the 6th day there is some attenuation if the proportion of hydrogen peroxide is as high as 1 per cent. Venom, alone or with the addition of copper only remains fully active in the same period. C IV

i. OH (Jintetsu) Experimentelle Untersuchungen ueber den Einfluss der wichtigeren formosanischen Schlangengifte auf die Koagulation des Kaninchenblutes *in vitro* [Coagulation of Rabbit Blood by the Common Formosan Snake Venoms *in vitro*].—*Japanese J Med Sci IV Pharm.* 1939 June, Vol. 12, No 1 pp 31-55 [21 refs]

ii. ——. Experimentelle Untersuchungen ueber den Einfluss der wichtigeren formosanischen Schlangengifte auf die Koagulation des Kaninchenblutes *in vitro* [Coagulation of Rabbit Blood by the Common Formosan Snake Venoms *in vitro*].—*Ibid* pp 57-78. [31 refs]

i. Venom dried over sulphuric acid and dissolved (1 in 5) in physiological salt solution was used with fresh or oxalated blood or with solutions of the coagulating elements, in these experiments. Of the 5 venoms tested four—*Mucrosquamatus*, *Ancistrodon*, *Bungarus* and especially *Naja*—increased the coagulation time. The remaining venom *Gramineus*, delayed coagulation in high concentration but accelerated it in medium and low strength. Clot retraction was lessened by all five. Delay in the appearance of the threads of fibrin due to destruction of fibrinogen and early disintegration of fibrin is responsible for the slow clotting, and in the *Gramineus* venom, which accelerates coagulation in low concentrations the accelerated coagulation results from the rapid formation of fibrin owing to the presence in the venom of a thrombin like substance.

ii. Experiments in living rabbits showed parallel results. C IV

CÉSARI (E.) & BOUQUET (Paul) Etude sur le venin blanc de *Vipera aspis* [Studies on the Colourless Venom of *Vipera aspis*].—*Ann. Inst Pasteur* 1939 Dec Vol. 63 No 8 pp 592-599

As has been noted before (this *Bulletin* 1939 Vol. 36 p 854) the venom of specimens of *V. aspis* captured in the Department of Gers is colourless, in contrast to the yellow venom obtained from the same species in other parts of France. The authors have made a study of this colourless venom and compare its properties with those of the yellow variety. Colourless venom *in vitro* has less coagulating and haemolytic power than yellow. *In vivo* it does not provoke the severe widespread local necrosis characteristic of the yellow venom, but has stronger neurotoxic action. This neurotoxic action is not destroyed by heating to 70°C. Serum prepared against the colourless venom protects against both varieties.

These findings support those of other workers who have shown that the venom of one species may have different properties in different geographical distributions [see this *Bulletin* 1938 Vol. 35 p. 431 1939 Vol. 36 pp. 856-859] C IV

GAUTRELET (J.) Le mécanisme de l'hypotension consécutive à l'injection de venin de cobra. [The Mechanism of Hypotension due to Cobra Venom.]—*Bull Acad Méd* 1939 Nov 14 & 21 103rd Year 3rd Ser Vol. 122, No. 32, pp. 412-417 [25 refs]

This paper is a discussion of the work of many investigators on this subject and the author concludes that the hypotension observed does not depend upon a direct effect on the heart. The action is not central but peripheral and the vegetative nervous system is not directly concerned, though it modifies the effect. This action of the venom is essentially exercised upon the capillaries and coincides with the liberation of histamine probably through the intermediary of lysoctithin. [See this *Bulletin* 1939 Vol. 36 pp. 564-565] C IV

TRETHEWIA (E. R.) Comparison of Haemolysis and Liberation of Histamine by Two Australian Snake Venoms.—*Australian Jl Experim Biol & Med Sci* 1939 June Vol. 17 Pt. 2, pp. 145-155 With 7 figs.

- i. BERTRAND (Gabriel) & VLADESCO (Radu) La glycémie chez le cobaye et le lapin sous l'influence du venin de cobra. [Glycaemia in Guinea-pigs and Rabbits Injected with Cobra Venom.]—*C R Acad Sci* 1939 Oct 16 Vol. 209 No. 16, pp. 585-587
- ii. ——— & ——— Sur la glycémie du cobaye et du lapin sous l'influence du venin de cobra.—*Ann Inst Pasteur* 1940 Apr Vol. 64 No. 4 pp. 344-348

i. Although the symptoms produced in guinea-pigs and rabbits by lethal doses of cobra venom are not the same they both show a degree of hyperglycaemia. This was measured in blood taken from the heart before and after the injection and with smaller doses of venom (1.0 to 1.5 mgm dry venom) varied between 13.7 and 25.2 per cent increase. With a dose of 12.0 mgm in a rabbit the increase was 7.5 per cent.

This phenomenon has not previously been reported and since the quantities are easily measured may by further study lead to better comprehension of the action of venom.

ii. This is a fuller account of the work reported above in which increases in hyperglycaemia amounting to as much as 84 per cent. in guinea-pigs and 35.7 per cent. in rabbits are recorded. It is shown that the increase is progressive until the death of the animal.

C IV

BERTRAND (Gabriel) & VLADESCO (Radu) L'action hyperglycémisante des venins de serpents. [Hyperglycaemia due to Snake Venoms.]—*C R Acad Sci* 1939 Dec 4 Vol. 209 No. 23 pp. 818-821

The authors have now tested the venom of 14 species of snakes both Viperidae and Colubridae for the power to increase the glucose

extended more crucial incisions are advised. Permanganate of potassium is not advisable as it of itself may cause sloughing

H H S

CHOPRA (R. N.) & CHOWHAN (J. S.) Snake Bites and their Treatment in India. Part II. The Management of Sequelae and Complications.—*Indian Med Gaz* 1939 July Vol. 74 No. 7 pp. 422-432. 28 refs

This is a full and clear account of the symptoms and treatment of the common snake bites of India. Attention is drawn to the importance of fear shock, which may constitute real danger to life, and a differential table between this and true venom collapse is given, in which it is emphasized that in fear shock the onset is sudden and there is no paralysis whereas in venom collapse the onset is more gradual and paralysis spreads gradually from the legs upwards.

Immediate treatment is briefly dealt with, and emphasis is laid on methods of suction and on the importance of artificial respiration. For later treatment of respiratory disturbances cardiozol and ephedrine are advocated for circulatory failure saline infusions and administration of veritol to counteract the histamine-like shock are useful, particularly after viper bites for haemorrhage calcium and other coagulants and vitamin C may be efficacious.

There follows a section which cannot be abstracted, on the identification of poisonous snakes and it is pointed out that it is not possible to lay down a brief criterion by which these can be recognized. [See also this *Bulletin* 1936 Vol. 33 p. 397] C IV

ALLEN (Frederick M.) Observations on Local Measures in the Treatment of Snake Bites.—*Amer J Trop Med* 1939 July Vol. 19 No. 4 pp. 393-404 [15 refs.]

The author has previously shown that occlusive tourniquets are useless and even harmful in the treatment of snake bite. The present paper is a record of experimental work on 159 rats, rabbits and cats, using the venom of *Crotalus atrox* and *Ancistrodon piscivorus*. It is shown that refrigeration of a limb may be worth a trial for any kind of venom which causes little or no local necrosis, but is contra-indicated for powerful proteolytic venoms. Excision is now largely abandoned since it must be wide to be effective even if performed immediately. It is a promising treatment for smaller bites such as that of the black widow spider. Amputation of the affected limb may be successful if not too long delayed, even after the bite of the king cobra. It is unsafe to delay amputation for as long as 24 hours even when absorption is retarded by a tight tourniquet. The only value of refrigeration or ligation, at least with reference to necrotizing venoms, is that they produce a certain anaesthesia so that operative measures may be undertaken in the absence of an anaesthetic.

The author therefore makes a plea for the wider teaching of mechanical methods of treatment such as the Jackson plan and considers that with proper use mortality from all kinds of venomous bites may be almost abolished. [See this *Bulletin* 1939 Vol. 36 p. 863] C IV

GITHENS (Thomas S.) & WOLFF (Nigel O.C.) The Polyvalency of Crotalid Antivenins. I. The Influence of the Composition of Polyvalent Antigens. II Comparison of Polyvalent Crotalid Antivenin with Monovalent *Crotalus D. Durissus* Antivenin. III Mice as Test Animals for Study of Antivenins.—*Jl Immunology* 1939 July Vol. 37 No 1 pp 33-39 41-45 47-51

I Antivenenes prepared against mixtures of various species of *Crotalus*, *Sistrurus* and *Ancistrodon* were found to be efficient in a considerable range but the efficiency was not determined by the venoms used in the immunizing mixture. For instance one antivenene was more effective against *Crotalus viridis viridis* which was not included in the venoma used in its preparation than against any of those venoms which had been used. Even the venoma of three species of *Bothrops* were fairly efficiently neutralized though no *Bothrops* had been used in preparation.

Certain antigenic components are therefore common to many venoms and an antivenene need not be prepared against all the venoms in question so long as enough are present to give a wide antigenic base.

Venoms of North American pit vipers from three antigenic groups (a) most of the rattlesnake venoms (b) venoms capable of causing late paralytic symptoms (c) moccasin venoms. To yield a satisfactory polyvalent antivenin at least one venom from each of these groups must be included in the mixture used for injections of the antivenin producing animal. The venoms used are listed according to these groups.

II North American pit viper venoms which induce delayed paralysis are strongly neutralized by a monovalent antivenene prepared against a venom which has this property. This supports the idea that there are two distinct neurotoxic constituents in pit viper venoms. One of these which is presumably present in all the venoms, acts largely on the respiratory apparatus the other acts on the voluntary muscles of the entire body. All other North American pit viper venoms are better neutralized by a polyvalent antivenene.

III Experiments similar to those on which the conclusions of the first two papers were founded were conducted using mice instead of pigeons as the test animals. The results were very similar. With certain viperine venoms other than those used in the work paradoxical results were obtained with the two antivenenes employed and demonstrate further how complex are the antigenic relationships of these venoms.

C IV

CÉSARI (E.) & BOQUET (Paul) Production rapide d'un sérum antivenimeux chez le lapin au moyen d'un anavenin. [The Use of Anavenin in the Rapid Production of Antivenene.]—*C. R. Soc. Biol.* 1939 Vol 132. No 25 pp 363-365

The antigen used was a 1 per cent. solution of the venom of *Vipera aspis* in a saline to which 4 per 1 000 formal was added (after the method of Ramon). This was kept at 37°C. for 17 days and thereafter at 4°C. After 7 days in the incubator it was no longer toxic for the rabbit in the amount of five times the normal lethal dose. Rabbits were inoculated weekly with this anavenin subcutaneously or intravenously in various doses for varying periods. Blood was then taken and mixed with 3 m.l.d. venom for 30 minutes at 37°C. and injected intravenously.

into fresh rabbits. It was found that the intravenous method of immunization with anavenin gave higher titres of antivenene than were given by the subcutaneous method although the total doses administered intravenously (61 to 72 mgm.) were smaller than those given subcutaneously (45 to 180 mgm.) In two rabbits 2 cc. serum were enough to neutralize 1 mgm. of the venom.

A number of the rabbits died during, and as a result of, the intravenous immunization with anavenin but no more than after the higher doses given subcutaneously. Immunization of rabbits with pure venom was almost impossible to obtain owing to death of the animals.

C IV

REVIEWS AND NOTICES

WHITE (R. Senior) AUBERTIN (D) & SMART (J) *Fauna of British India, Diptera. Vol. VI. Family Calliphoridae. 1940 London. [18s]*

In the present book the authors include not only the Calliphorine flies (e.g. *Calliphora Lucilia*) but also *Chrysomya Sarcophaga* as well as many other genera not known to be of medical interest. The book has therefore a distinct value to medical entomologists, because some of the insects included in it have habits like those of the house fly visiting human food but also feeding on deposits of faeces and others cause myiasis, either primary or secondary. The introduction includes a good general account of the external anatomy of these flies with it and the illustrations of diagnostic points anyone with a general knowledge of the anatomy of Diptera could make precise identifications at least in the majority of cases. The authors' main interest is systematic but short notes on early stages and biology are given when anything is known. They have included in their area not only India but the rest of the Oriental Region which includes the Malay Archipelago Siam Indo-China and Southern China. As many of the species are very widely distributed the book would also have considerable value to an entomologist working in Tropical Africa.

P. A. Buxton

TROPICAL DISEASES BULLETIN

Vol. 37]

1940

[No 7

SUMMARY OF RECENT ABSTRACTS *

VI PLAGUE

Epidemiology

UTTERLY (p 307) points out that in Hong Kong climatic conditions of mean temperature 83°F relative humidity 83% and aqueous vapour tension 0.500 favour the spread of plague. When these factors approach respectively 82° 83° or more for 3 to 4 months and 0.900 the disease tends to die out. But as these factors have often prevailed in non-epidemic years it is necessary to look for other causes which govern the appearance of plague. The severity of plague has diminished everywhere in S. China irrespective of sanitary improvement.

RAO (p 962) shows that the known factors of rat density flea infestation and climatic conditions are favourable to the development of plague in Calcutta and that deaths which may be due to plague are occurring in the bustees or groups of huts. Known sporadic cases occur but have attracted little attention and he argues that they are probably not imported, and that cases would be found if they were looked for. A systematic examination of the rodent population including the bandicoots and others is desirable. YANG *et al* (p 960) discuss the spread in Fukien of plague which was originally carried by rats and fleas in merchandise from seaports along the rivers to the interior. Rat communities on farms are rapidly exterminated in the epizootics and in areas difficult of access the epizootic may die out completely but on the other hand villages may be sources of re-infection of new and susceptible rat populations in the towns. Over the whole province rat infestation is common. In Kenya ROBERTS (p 965) shows that the incidence of plague both in man and rats is more closely associated with the density of rat population than with any other factor.

ALFARADO and DE LA BARRERA (p 962) note that in the Argentine one of the features of sylvatic plague is the small amount of human infection experienced but that this is offset by the tendency to the production of pneumonic plague.

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

Aetiology

GIRARD (p. 310) states that more certain and quicker results are given in identification of *P. pestis* by subcutaneous injection of a suspension of test material in salt solution than by application to the shaved skin. CASTELLAKI (p. 963) gives details of a rhmannose culture medium for the differentiation of *P. pestis* from *P. pseudo-tuberculosis rodentium*.

RAO (p. 963) shows that three amino-acids, proline, phenylalanine and cystine are necessary for the growth of *P. pestis* and that glycine though not essential acts as a stimulant. Accessory growth factors are not essential and there is little difference between virulent and non virulent strains in nutritional requirements. SOHNEY (p. 976) also records similar findings.

ESKEL (p. 310) points out that *P. pestis* may retain its virulence for as long as four weeks in dried flea faeces.

TELMANSKY (p. 964) shows that *Proteus vulgaris* is antagonistic to *P. pestis* which may explain how plague bacilli disappear in decomposing bodies in which putrefaction is largely due to *Proteus*. RUSSO (p. 964) however found that the plague bacillus may be recovered in pure culture from the bone marrow more than 10 months after the death of rats or guinea-pigs without contamination by *Proteus*. He points out the importance of bone marrow examination.

FAVORUSOVA (p. 963) describes the morphological modifications of the plague bacillus brought about by bacteriophage BREININGER (p. 964) has investigated the action of calcium chloride on the plague bacillus.

Transmission

In an epidemic in the Volga, VINE (p. 307) shows that all the early human cases had definite association with some grain store or shop and that infection travelled with bags of grain.

PISTONI (p. 311) reports on the rats and fleas of Entrea and Sclon.

Rats.—SOHNEY (p. 976) shows that in Bombay in 1907 *R. rattus* and *R. norvegicus* formed 99 per cent of the rodent population. Recently however *Geomys teris* has increased to 30 per cent of the total and is highly susceptible to plague whereas the other two species now show considerable resistance.

MORGAN (p. 313) details the procedure to be adopted in Britain for examining rats for plague.

Wild rodents.—Much attention has been paid during the year to the problem of sylvatic plague and ESKEL and HAAS (p. 968) point out that the determination of the existence of plague infection in wild rodents is now a regular epidemiological feature in the western U.S.A. METZ (p. 315) refers to the importance of sylvatic plague which is a persistent infection in the rodents of California. Species of the genera *Citellus*, *Marmota*, *Entomias*, *Cynomys*, *Peromyscus* and *Neotoma* have been incriminated. ESKEL and HAAS (p. 968) show that although foci of wild rodent plague are widespread in California the absence of domestic rats accounts for the absence of epidemics in man. GIBSON (p. 967) failed to find plague in a large number of wild rodents and their fleas in Alberta and British Columbia but thinks it probable that sylvatic plague will spread from the western U.S.A. within the next few years.

VAN CAMPENHOUT (p. 966) found that *Mastomys natalensis* is the carrier concerned in a focus of sylvatic plague in the Belgian Congo.

near Lake Albert. ROBERTS (p 965) on the other hand shows that sylvatic plague has not been found in Kenya though large numbers of field rats and fleas have been examined. He believes therefore that the theory that field rodents and their fleas are concerned with the spread of plague in Kenya appears to be incorrect.

RISTORCELLI (p 312) reports on the rodents of Tunis

RAMOS DIAZ (p 310) shows that in the Peruvian mountains plague exists in the cul, a species of guinea pig. *Pulex irritans* has adapted itself to the cul and it is thought that this flea transmitted plague to man in a small epidemic reported. In the Argentine ALFARADO and DE LA BARRERA (p 962) show that epizootics of sylvatic plague appear during the winter and fade out in spring the infection is subacute and the dead animals may show few macroscopic signs. The rodents and fleas concerned are given.

KOROBKOVA *et al* (p 967) conclude from their work that agglutination reactions on the blood of spermophills are not useful in epidemiological investigations

JELLISON (p 968) proposes the view that predatory birds may be important in the spread of plague either by close association with rodents and their fleas (as with the booby owl and the ground squirrel which occupy the same burrows) or by carrying diseased rodents or by passing infected faeces after eating diseased animals. The latter has been proved possible by experiment

Fleas—BUXTON (p. 308) describes a chamber devised for the study of *X. cheopis* living on a mouse under controlled conditions of temperature and humidity. The studies cannot be further abstracted but suggest that the number of fleas found on the animal bears no constant relation to the total population. The climate of rat holes and harbourages should be studied.

ESKEY and HAAS (p 969) show that the degree of infectiveness for fleas of infected guinea pigs bears a close relationship to the degree of bacteraemia present. no flea was infected by blood which did not also give a culture of *P. pestis*. ESKEY (p 310) similarly points out that it is only shortly before death that the septicaemia of an animal is sufficiently intense to infect fleas and that only blocked fleas are infective by bite. The period of infectivity is short since blocked fleas as a rule live only 24 to 48 hours [but see below]. It is probable that any flea may be a vector though *X. cheopis* and *Nosopsyllus fasciatus* are particularly active and dangerous. Probably all rodent fleas must be starved before they prefer human blood and wild rodent fleas are not nearly so dangerous to man as *X. cheopis*.

ESKEY and HAAS (p 968) consider that fleas are not found for long in abandoned burrows of field rodents. There is apparently little difference between wild rodent fleas and domestic rat fleas in the readiness with which they become infected, and once a flea is proved infected by transmission its average survival is only 32 days whatever the species. A period however varying from 5 to 130 days, elapses before the fleas are infective by bite. This demonstrates that the fleas may harbour the bacilli in the gastro-intestinal tract for a long time a fact of the highest importance in determining their efficiency as vectors (and in the epizootology of rodent and rat plague. ESKEY (p. 310) points out that although in his opinion the view that infection by means of flea faeces rubbed into the bite or into scratch abrasions has been discarded for man it probably holds good for rodents and not only is the period during which infective faeces may be passed

long, but it should also be remembered that *P. pestis* may retain its virulence as long as 4 weeks in dried faeces]

ROBERTS (p. 965) found that although *X. cheopis* and *X. brasiliensis* were easily shown to be vectors, experiments with *Ctenophthalmus cabirus* and *Dinopsyllus hyemalis* from field rats were failures.

For the determination of the existence of plague infection in wild rodents ESKEY and HAAS (p. 968) have found that inoculation of guinea-pigs with bodies of captured fleas is a more efficient procedure than systematic examination of killed rodents. Parasites killed with HCN are much more infective than those killed with chloroform or ether and HCN should therefore be used before sending the fleas in 2 per cent salt solution to the laboratory. This solution inhibits secondary organisms, prevents putrefaction and has no deleterious action on *P. pestis*. Another medium having the same action is described by DEVIGNAT (p. 969) who shows that Broquet's medium of calcium carbonate 2, glycerol 20 and distilled water 80 acts not only as a clearing agent for fleas, but ensures the survival of the bacilli up to 6 days and prevents putrefaction. He describes the procedure adopted in the Belgian Congo in examining fleas and the bone marrow of rats with the help of this medium.

TIFLOV and POTAPOV (p. 973) show that all species of fleas which occur on ground squirrels migrate from abandoned burrows, and the experiments carried out appear to suggest that the maximum migration takes place within a month or two of the elimination of the rodents from the burrows.

RUSO (p. 965) found that a number of invertebrates, including flesh eating flies of the genus *Sarcophaga*, may contract plague and may become intermediate sources for the conveyance of infection. Acari living on mummified rats may become infected owing to the long survival of *P. pestis* (p. 964).

Clinical Findings and Treatment.

ROBIC and MINEC (p. 313) report a case of bubonic plague in which intramuscular abscesses developed. From one a pure culture of *P. pestis* was obtained from the other *P. pestis* and *Staphylococcus albus* were recovered. Association of *P. pestis* with a streptococcus in gland juice is recorded by FARINAUD (p. 970) but in this case streptococci alone were found in several buboes from other sites at an earlier stage and it is thought that the primary infection was therefore due to the streptococcus.

MURDOCK (p. 969) describes an outbreak of pneumonic plague in a hospital in which there were 15 deaths in 16 cases, many occurring in the attendants of the first patient, nurses, and doctors. Diagnosis was made retrospectively by examination of bone marrow from an exhumed corpse.

SOKHEY (p. 976) reports that of 124 cases of plague 69 were treated with anti plague serum and 55 with intravenous iodine—the mortality in the former was only 27 per cent. compared with 65 per cent. in the latter.

Sulphonamides—DURAND (p. 970) has investigated the protective action of M & B 693 in mice. About 2 mgm per gm was ingested daily and the mice were inoculated on the 5th or 6th day the drug treatment being continued afterwards for 6 to 17 days. The mice were able to withstand 10 000 lethal doses but with 20 000 to 300 000 most of them died, although no bacilli could be recovered from them.

It was found that the mice protected by the drug developed immunity in proportion to the size of the test dose of bacilli. With doses of the drug reduced to 0.5 mgm. per gm. the protective action and sterilization were imperfect. GIRARD and GIRARD (p. 971) obtained similar results in mice and guinea-pigs with M & B 693. SCHÜRZE (p. 971) shows that white mice all succumb to a dose of about 100 *P. pestis*. He found that sulphone in mice and soluseptasine in rats had protective value but that M & B 693 was more potent than either in both animals. Serum prepared by injection of the Otten strain of *P. pestis* also protected in large doses but though the results were good the author considers that possibly a combination of serum and drug may prove superior to either alone.

Prevention

SILVETTI (p. 977) would confine anti-plague measures in the Argentine to providing for the sick segregation of contacts disinfection and deratization. He considers that vaccination produces an undesirable negative phase and is only protective for a short time. Serum therapy is apt to produce allergic disease.

Rat-proofing etc.—In Java the house improvement programme continues and ROSIER (p. 974) reports 32,318 houses dealt with in the year 1937. In some parts of the improved areas plague has reappeared on a small scale but is easily controlled by deratting and restoration of the improved houses. Over 50,000 new houses have now been built under anti-plague supervision. Vaccination continues and during the year the numbers of cases and deaths have fallen satisfactorily.

YANG *et al.* (p. 960) in Fukien instituted for shops rat proofing measures which were calculated to take into account the protection of (1) bulk stock (2) replenishment stock and (3) retail goods. This organization proved to be efficient and kept the total costs of the campaign very low. In the *Boletín Sanitario* (p. 962) it is shown that ordinary anti-rat methods have resulted in a diminution of rats in the ports of the Argentine in some cases by as much as 70 per cent.

In Hawaii (p. 973) the use of poison bait has been successful the poison being banana loaded with phosphorus. BAHR (p. 978) writes of the value of ratin cultures which have remained very constant for 31 years and which give a rat mortality of 60 to 90 per cent. The squill preparation ratimin is also useful but is not satisfactory against mice in the preparations used.

Fumigation.—MEYER (p. 315) reports that trapping of field rodents over small areas is followed within two months by recovery to a considerable fraction of the original numbers and that rodent control over a narrow belt is soon followed by re-invasion. Methylbromide at the rate of 10 cc. per burrow opening is very efficient in controlling both rodents and fleas. STEWART and MACKIE (p. 316) also report on the efficiency of methylbromide against rodents and fleas but point out that it is dangerous to man since it is colourless, odourless and poisonous. It does not render food materials toxic however and can therefore be used for the fumigation of cargoes. They emphasize the importance of killing off fleas which are not only vectors but also reservoirs of the disease [see ESKEY and HAAS above].

BABENUSHEV *et al.* (p. 972) note that the number of fleas in the burrows of ground squirrels is reduced as a result of fumigation with chloropicrin or calcium cyanide. In an outbreak in the Nilgiris VINE (p. 307) states that Cyanogas and Calcid were used as disinfectants and

Shelltox and Flit as pubicides—In FULKEN YANG *et al.* (p. 980) treated rat burrows with calcium cyanide and distributed poison bait in the houses.

General—For the protection of anti-plague workers against fleas and the poison gas used in disinfection BHARGAVA (p. 971) recommends white clothing preventing any access to the skin the use of long thick rubber gloves, or the smearing of arms and legs with kerosene soap emulsion and vaccination. Hours of work should be short and workers should be in pairs to keep a watch for fleas. He notes that Cyanogassing by means of Calcid briquettes is relatively safe. MEYER (p. 315) gives advice on the control of sylvatic plague. From the personal point of view he emphasizes the importance of gland puncture in diagnosis, the use of antiplague serum the quarantining of rodents before sale, the avoidance of rodents in general and the rodent-proofing of summer houses. Noteworthy rodent mortality should be reported and diagnosis may be made by mass inoculation of tissues or fleas by the pool method. Reference is made to the skin tests and serological procedures used in Russia.

Vaccination

With living organisms—In a study of the avirulent E.V. strain of *P. pestis* isolated by GIRARD in Madagascar ANCHETAR (pp. 313-376) arrives at the following conclusions—the strain is identical with *P. pestis* it is avirulent for the very susceptible guinea-pig in moderate doses but in large doses (of 250 000 million organisms) causes death by toxic action in guinea-pigs and rats, it has selective effect on lymph nodes and spleen is temporarily present in blood and bone marrow and persists for some time at the site of inoculation and the inoculation gives rise to local inflammation and temporarily to more generalized lesions.

GIRARD and ROBIC (p. 314) record over 2,000 000 vaccinations with E.V. in Madagascar during 1935 to 1937 with it is claimed, a reduction in plague mortality of 80 per cent. PASSA (p. 314) shows that in Madagascar the cases of plague fell from 3 493 in 1935 to 918 in 1937. ROBIC (p. 314) quotes similar figures and shows in a graph how the incidence has fallen in relation to the vaccination campaign. VOGEL and RIOU (p. 375) refer to the same work and show that in one area 77.5 per cent of the population were vaccinated in a short period.

In Java vaccination with Otten's living vaccine continues and ROBIC (p. 374) reports 1,804,234 inoculations during 1937 most of which were reinoculations. He attributes the steady decline of plague in the first place to the vaccination campaign, but of course the long term policy of house improvement is continued.

With dead organisms—SCHUTKE (p. 374) working with vaccines of organisms killed at 55°C. for 15 minutes, found no superiority in rats and mice of virulent strains over avirulent or of smooth over rough. Strains grown at 37°C. and therefore containing more envelope antigen give maximal protection to rats in which the test dose is large and toxic but in mice in which the test dose is small and invasive the envelope antigen appears to play a smaller part. Some other antigen is therefore concerned. The superior protective power of a smooth avirulent living vaccine depends upon its capacity for survival in the animal, which is longer than that of a rough strain. SOXNEY (pp. 376-377) however finds that vaccines made from broth cultures are more potent when incubated at 27°C. than at 37°C. though the reverse holds good for agar

cultures. Killing by heat at 55°C for 15 minutes is better than the use of phenol or formalin. Trials of living avirulent strains have disclosed great variations in protective power from high values to none. The antigenic values of a large number of virulent strains however were very constant.

In Brazil BARRETO (p 977) uses killed vaccines of which he gives details but no work to assess their value is quoted. C Wilcocks

HELMINTHIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Technique general surveys and immunity—LANE (p. 477) quotes his findings which show that the straining of faecal suspensions causes a loss of eggs of worms which invalidates egg counts made on strained suspensions and outweighs the advantages to be gained by clearer preparations. He shows that pouring off causes a loss of eggs and that the strength of solutions of salt for floatation needs to be varied according to the kind of eggs concerned, and he states that the shape of the vessel in which floatation is carried out the technique of lifting off the cover slip and the examination of the preparation as a hanging drop without reversal of the cover slip are important in maintaining the efficiency of the D.C.F. process.

SMITH *et al* (p 478) working in Alabama show once more that the heaviest hookworm rate was found in places with sandy soil, the lightest in those with clay. The Cellophane swab is more efficient than the Willis technique in detecting *Enterobius* infection. MILLER (p 478) shows that in general, the heavier the worm load the fewer eggs does each female produce.

GIOVANAOLA (p 479) reports on intestinal worms in Sardinia. SENEKJI *et al* (p 479) record the intestinal protozoa and worms found in a survey in Iraq. DE MEILLOV and HOLLAND (p 480) report on intestinal worms found in patients in Zululand hexylresorcinol is used in treatment. JADIN and DELPERDANGE (p 480) give the results of a worm survey in man and animals in Coquilhatville. CRAM and FOLAN (p 480) record the intestinal worms found in school boys in the United States.

CHANDLER (p 481) discusses local immunity in parasitic infections and points out that it should not be confused with general immunity. With regard to most intestinal helminthic infections local immunity is of two kinds, the reaction to parenteral migration or mucosal burrowing of larvae, and the reaction to adult parasites in the intestine. The latter is largely influenced by the feeding habits of the parasites.

Trematodes Schistosomes—VAN DEN BERGHE (p 482) discusses schistosomiasis in the Congo giving figures of the incidence in different parts. He is inclined to regard *S. intercalatum* as a subspecies of *S. haematobium* and finds no evidence of the existence of the species named *S. faradjes* by WALKIERS. In a village in which infection with *S. mansoni* was common the clinical picture resembled that produced by *S. japonicum* but in this place no Planorbis and few other snails were found.

MOZLEY (p. 483) has studied the snail hosts of *Schistosoma haematobium* and *S. mansoni* in Zanzibar and Tanganyika Territory where from 10 to 70 per cent. of the natives are infected. He advocates control of the snails by drainage flushing, poisoning (by preparations of local plants) and vegetation which, if completely covering the surface of water appears to restrict the snail population. SCOTT (p. 484) shows that in Venezuela the snails concerned in *S. mansoni* infection are not found in rivers but in the more slowly running irrigation channels. The rate of human infections is high and is particularly so in those who work in connexion with the irrigation. Control should be through the rebuilding and maintenance of drains and canals intermittent use of these and improvement of rural sanitation.

GIOVANNOLA (p. 485) discusses the intermediate hosts of *S. mansoni* in Eritrea. BARLOW (p. 485) shows that there is a seasonal fluctuation in the infestation rate of snails with human schistosomes, with diminished infection during the winter and states that this may have a bearing on control measures. PALLARY (p. 485) shows that excess of magnesium salts in the water of part of N. Africa appears to be related to the absence of *Bulinus* and *Planorbis*.

MAINZER (p. 485) finds that in *S. mansoni* infections, as in *S. haematobium* latent pulmonary involvement is usually present even in the absence of pulmonary symptoms, and that X-ray reveals it about 3 months after infection. He describes the X-ray appearances and states that antimony treatment appears to have no effect on the development of the lesions. BAYOUMI (p. 486) reports a case of bulbarial myelitis.

PANAYOTATOU (p. 486) has used anthelmabine with success in urinary schistosomiasis. In studying the electrocardiographic changes during treatment with tartar emetic, MAINZER and KRAUSE (p. 487) found changes, together with bradycardia, which are the result of drug intoxication of the heart muscle and which may exceptionally result in atrricular fibrillation and sudden death.

BOVNE and SANDGROUND (p. 487) found eggs of *S. japonicum* in a large proportion of natives in Central Celebes, but found no infected snails. No dysenteric symptoms were produced by the infection. BARTSCH (p. 488) claims that *Oncomelania yanoi* n. sp. is a host of *S. japonicum*. KATO (p. 488) describes a method of collecting the cercariae of *S. japonicum* which escape from snails.

The Committee on Water Pollution Wisconsin (p. 488) advocate the use of copper carbonate for eliminating snails harbouring cercariae responsible for swimmers itch in recreational bathing areas.

Others—HSU (p. 489) has studied the cells and inflammatory products found in the intestine of various flukes and presumably ingested during feeding. LANE in comment points out that plasma or lymph must also have been ingested.

GALLIARD (p. 489) reports on the molluscan and fish hosts of *C. sinensis* in Tonking. MIYANAGA (p. 489) reports 6 species of fish found to harbour cysts of *C. sinensis* in the Mukden area. KATO (p. 490) reports on foudrin and Suzzo A in experimental infection with *Clonorchis*.

KINUGASA (p. 490) discusses infection with *Paragonimus* in the Smtiku Prefecture.

BOVNE (p. 490) reports 7 cases of infection with *Echinostoma ilocanum* discovered at autopsy in Celebes and names the first and second intermediate hosts (of which the most important are mussels).

The worms were present in the jejunum and the main symptoms were diarrhoea and slight abdominal pain but in the 7 cases the cause of death was independent of the infection. He discusses the cercariae. BONNE and SANDGROUND (p. 491) found heavy infection rates by stool examinations in villages in Celebes. All mussels taken from Lake Lindoe close to these villages were found to carry large numbers of metacercariae and they are eaten largely by the natives after a primitive boiling process. C IV

LANE (Clayton) Hookworm Diagnosis. Assumptions, Alterations, Controls, Time-Lag, Rediscoveries D.C.F.—*Trans Roy Soc. Trop Med & Hyg* 1940 Mar 20 Vol. 33. No 5 pp 521-536 With 1 fig. [20 refs.]

This is the paper referred to in the note [this *Bulletin* 1940 Vol. 37 p. 65] that follows abstracts of 3 papers from New Orleans. In one of these papers it is stated that Lane's D.C.F. technique is recognized to be both qualitatively and quantitatively very efficient for the concentration of helminth eggs. It is pointed out in this one that these authors' own results got by their adaptation of D.C.F. seem hardly to merit this high praise and it is asked whether or not the real D.C.F. does so.

The appraisement of various techniques by the New Orleans writers was based on strained faecal suspensions and the techniques were graded by the different kinds of infections each disclosed from these. Of their efficiency in estimating weights of infection (information which a medical man may rightly expect from a laboratory) there was no report. For this purpose egg counts have been used for 50 years; indeed it was these that pointed Looss to the skin route of hookworm infection. For grading techniques egg counts date from 22 years ago when Lane used them for valuing levitation. To obtain a clearer field he too at that time used a strained faecal suspension but the use of hookworm egg counts to appraise D.C.F. showed 16 years ago that straining had reduced the egg collection to between 31 and 43 per cent. of that certainly present that is of those got from unstrained suspensions. Yet the New Orleans workers held that the sieve itself had little or no effect in retaining hookworm eggs. At least there is retention on it and the stickiness of hookworm eggs presumably has a share in causing it. This property was discovered by PEPPER 32 years ago, rediscovered by Lane 22 years ago and by him used for his levitation technique in the course of appraising which by egg counts there occurred an instance in which 2,227 of 2,336 hookworm eggs remained sticking to the slide when levitation had lifted off almost all other faecal matter. It was, indeed, to get rid of this stickiness that STOLL 17 years ago used a caustic soda solution in his counting technique. In Lane's experience the loss of hookworm eggs on straining has far outweighed the obvious advantage of a clearer preparation.

Contrasting the details of the real and of the adapted D.C.F. Lane showed 16 and again 15 years ago that the single pour-off of D.C.F. caused a loss of hookworm eggs amounting to between 0 and 25 per cent. in the adapted technique there are repeated pour-offs with washings and centrifugings between and the report ignores the question of any possible loss thereby caused. In valuing D.C.F. Lane found that the salt and the strength of its solution used for floatation should vary with the kind of egg to be lifted. Thus for hookworm eggs

solutions of s.g. 1.150 and 1.200 were equally effective while for those of *Ascaris* this must be 1.300 (got in Lane's work by calcium chloride) for effective delivery when it was 1.200 the egg delivery dropped from this figure to a half and when 1.150 to a twenty-fifth for the adapted technique a specific gravity of 1.180 got by zinc sulphate was held satisfactory without evidence offered as to its worth in floating parasites regardless of their specific gravity. Again egg counts showed Lane that the size and shape of the floating fluid influenced egg collections in the adapted technique using a "Wassermann tube," these points are in doubt for workers in Britain. In the success of the real D.C.F. a square cover rapid lift, the examination of the preparation as a hanging drop are important. In the adaptation the cover was round, the lift was left partly undetermined in kind and the cover was laid on a slide. When in the adapted technique the preparation was stained it was reversed reversal being no part of the real D.C.F. the effect of this in spilling eggs in the deep hanging drop got with rapid lift was not tested, but in the larger Willis preparation taken from a solution with s.g. 1.200 the average loss of hookworm eggs on reversal was 56 per cent. and of *Ascaris* eggs 43 per cent. In no instance, then, was evidence offered that any adaptation made in New Orleans was for the better some were certainly for the worse. If in their experience, this technique, when altered for the worse still merits the high praise they have mentioned, the real D.C.F. seems worthy of more serious attention than it has received in that city.

Clayton Lane

SMITH (W. H. Y.) GILL (D. G.) & McALPINE (James G.) *Intestinal Parasite Survey in Alabama.—Southern Med J* 1939 Nov Vol. 32, No. 11 pp. 1094-1104. With 4 maps & 5 charts.

This survey carried out from 1934 to 1937 completes the authors' preliminary report [this *Bulletin* 1937 Vol. 34 p. 874].

All faecal specimens were examined by the Willis gravity floatation method and egg counts were done by that of the Caldwell's. In all, 253,630 persons were examined. Hookworm infection was detected in 15.3 per cent. whites being consistently more highly infected than coloured persons, and the infection rate varying as usual with the nature of the soil in the sandy zone its percentage averaged 34.0 in the zone with sand and clay 18.6 in the zone with clay 4.4. The discovered *Ascaris* infection was 1.1 per cent. That for *Hymenolepis nana* was 1.4 it was higher in the white than in the coloured group and lessened with age. *Trichuris* infection was found in only 105 (0.04 per cent.) In an institution for mental defectives 415 of 637 (65.15 per cent.) were found infected with *Enterobius* when Hall's Cellophane swab and the Willis method were both used, but the latter disclosed 16 only about three-quarters of those finally detected by repeated swab examinations were found in the first of these.

C. L.

MILLER (Max J.) *The Egg-Count Index of Trichocephalus vulpis Infections in Dogs.—Proc Soc Experim Biol & Med* 1939 Oct. Vol. 42 No. 1 pp. 301-303.

Although the worm-egg ratio in this whipworm of the dog (as determined by egg counts of faeces and counts of worms got from the

intestine of the killed hosts) has a doubtful validity for the parasite of man it at least serves once more to illustrate that there is no fixed ratio for a worm species but that in general the heavier the worm load the fewer eggs does each female produce C L

GIOVANNOLA (Arnaldo) Alcune osservazioni sulla diffusione delle elmintiasi umane in Sardegna. [Notes on Worms in Man in Sardinia]—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol. 2. Pt 2. pp 407-414 With 2 figs.

The paper deals with intestinal worms. After noting previous reports there are given the findings in 209 faecal examinations, namely *T. trichiura* 42, *A. lumbricoides* 16 *E. vermicularis* 2 *H. nana* 10. The method of examination was to pick out from the faeces gross undigested matter and sieve the rest by pressure. Part of the sieved matter was put in a conical vessel with water another part was set in a petri dish which was filled to the brim with a saturated solution of common salt and covered by glass laid on it. Each preparation was stood for 15 minutes after which the sediment from the first was pipetted off from the second the covering glass was rapidly lifted, reversed and a coverglass applied. No mention has been found of important matters—for instance the measures taken to verify saturation of the salt to particulate the faeces to determine that the limit of effective concentration was not exceeded and whether there was effected avoidance of the common loss of fluid (and eggs) on reversal of the collecting glass. [See also LANE above] C L

SENEKJI (H. A.) BOSWELL (C.) & BEATTIE (C. P.) The Incidence of Intestinal Parasites in Iraq—*Trans Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33 No 3 pp 349-352

Of 1 000 faecal examinations in Iraq 84.5 per cent were found positive for intestinal animal parasites. Besides that urinary schistosomes and hydatid disease are common.

Specimens were forwarded to the laboratory with the least possible delay and without preservative. There they were examined by four methods (1) a wet film in saline (2) an iodine stained wet film (3) a film obtained by the brine floatation technique (4) two slides fixed in Schaudinn's alcohol sublimate and stained by Heidenhain's iron haematoxylin. Nearly all specimens were from apparently healthy young adults. Of the examined 55.6 per cent. were infected with potentially pathogenic organisms, that is with helminths or *E. histolytica*. The actual percentages of detected infections were protozoa 73.9 *E. histolytica* 22.9 *E. coli* 49.3 *E. nana* 18.1 Iodamoeba 19.1 Giardia 8.5 Chilomastix 8.8 Trichomonas 0.5 *D. fragilis* 0.2. The percentages positive for helminths were 41 in all, *Ancylostoma duodenale* 25.6 *Ascaris* 13.6 *Enterobius* 1.6 *Strongyloides* 0.7 *Trichuris* 3.4 *H. nana* 2.1 *Taenia saginata* 0.6 *Dicrocoelium* 0.1. All adult hookworms examined were *A. duodenale* this infection was highest (46.3) and *Ascaris* infection lowest (8.9) in Baghdad Liwa excluding Baghdad City while *E. histolytica* was higher in the City (34.4) than anywhere else. C L

DE MEILLON (Botha) & HOLLAND (E.) Helminthological Notes from Zululand.—*South African Med J* 1939 Dec. 23. Vol. 13. No 24 pp. 798-802. With 2 figs. [18 refs.]

"Stools were usually collected from hospital patients. Four specimens were prepared from each stool, two by the usual floatation method in saturated salt solution and two by precipitation with a centrifuge after thorough mixing in water.

Ascari infection was the commonest then Trichuris, then hookworm and Taenia species. Ascari causes more disability among Zulu children than any other helminth there is instanced a boy of 14 with intestinal obstruction two feet of the small intestine being packed with 476 of them, about 40 being passed later the strength of the argument for air borne infection [thus *Bulletin* 1934 Vol. 31 p 605] is accepted. Taenia infection was found to be a serious complication of amoebic dysentery which latter could not be cleared up till the worm had been expelled. Heterodera and Fasciola eggs come in the flat of those certainly or probably swallowed in food. Hexylresorcinol was used as the drug of election, though there were two instances of profound shock after it, both recovering. One of the two unidentified eggs, illustrated, seems to be that of Trichostrongylus. C L.

JADIN (J) & DILPERDANGE (G.) Contribution à l'étude de l'helminthiase et de la parasitologie de l'Equateur (Worm and Parasite Infections on the Equator)—*Ann Soc Belge de Med Trop* 1939 Dec 31 Vol. 19 No 4 pp 547-556

Examinations were made at Coquilhatville on man and animals. Those on man are as follows, as shown by at least three microscopic examinations of stools—presumably by smear since it is stated that enrichment technique would without doubt have given higher figures. The number of examinations made in 1937 were 4 778 and in 1938 were 4,511 while the percentages of infection found were respectively in these years hookworms 43 and 53 Ascari 25 and 28 Trichuris 14 and 12 Strongyloides 11 and 10. In addition the actual finds in smaller numbers and over the whole period were *Schistosoma haematobium* 32 *S. mansoni* 7 *D. dendriticum* 3 *Schistosoma bovis* 3 *D. latum* 2, *H. nana* 1 *T. saginata* 1 *T. colubriformis* 1. *L. loa* and *A. persians* are fairly frequent. C L.

CRAM (Eloise B) & FOLAN (John P.) Intestinal Helminths found in Boys recently arrived in Washington, D.C., from Various Parts of the United States.—*Rev Med Trop y Parasit Habana* 1939 Sept-Oct. Vol. 5 No 5 pp. 243-256

The results of examination of 364 white and 249 negro boys who had recently arrived at the National Training School for Boys from all parts of the United States.

For threadworms the examination was by the N I H swab for others the faeces were examined by the Willis gravity floatation method using a saturated solution of common salt. The swab examinations numbered 1 191 on 303 boys, each being examined 2 to 7 times and this is compared with an earlier series of 303 boys each examined by one swab. This multiple examination gave an incidence 1.6 times greater in whites and 2.4 times greater in negroes than did a single swab. The total detected incidence in 608 was 12 per cent. In 504 faecal examinations

the number of positives for 357 white and 237 negro boys respectively were *Ascaris* 7 and 3 *Trichuris* 19 and 4 *Necator* 48 and 8 *Enterobius* 5 and 0 *Hymenolepis nana* 2 and 4 *Taenia* species 1 and 0 C L

CHANDLER (Asa C) The Nature of Local Immunity in Parasitic Infections.—Reprinted from *Volumen Jubilare Pro Prof Sadao Yoshida* Osaka Japan 1939 Mar Vol 2 pp 343-364 [44 refs]

The author's conclusions are as follows —

1 Local immunity should not be confused with general tissue immunity or locally manifested general immunity. The immunity in malaria appears to belong to the latter category. Parasites in the circulatory systems, enclosed body cavities or embedded in internal tissues would not be expected to give rise to local immunity whereas parasites located in skin, in the lumen or lining of the intestine or in the lumina or lining of biliary urinary genital, or respiratory passages may do so.

2 Local immunity as described in bacterial infections is sometimes dependent upon cell mobilization and may not always be strictly specific.

3 A local immunity to toxic effects has been demonstrated in the screw worm (*Cochliomyia americana*) infections.

4 A different type of local immunity directed against the nutrition and vitality of the parasites has been demonstrated in infections with the African skin maggot, *Cordylobia*. The development of this reaction in *Cordylobia* and not in *Cochliomyia* infections is believed to be due to subsistence on living tissue in the former and in proteolyzed tissues in the latter. It is suggested that other tissue-feeding parasites may be independent of functional immunity the host tissue modified by digestion serving as an antigen.

5 A true local immunity entirely independent of the presence or absence of a general immunity accompanied by an antibody response occurs in Coccidian infections. The functional immunity apparently depends upon failure of nutrition of the parasites, and a sloughing off of the cells injured by invasion of the sporozoites.

6 There is as yet insufficient evidence for the development of a local immunity in amebic infections.

7 In most helminthic intestinal infections there are two phases of immunity (1) a reaction to parenteral migration or mucosal burrowing of the larvae before they grow to maturity and (2) a reaction to the adult parasites in the intestine. Parenteral migration such as occurs in hook worms *Nippostrongylus* *Strongyloides* and *Ascaris* stimulates a general immunity which is shared by the intestinal mucosa. Mucosal burrowing may not be highly effective in producing a local reaction interfering with nutrition since the burrowing larvae are demonstrably not dependant upon living tissues for sustenance but an immunity similar to the general immunity to migrating parenteral larvae may be developed, though more rapidly due to the localization of the parasites. The type of immune reaction to adult intestinal worms is largely influenced by their feeding habits. Those like *Nippostrongylus* and *Strongyloides* which feed on mucosal tissue stimulate a local immunity directed against their nutrition. Those which feed on blood are not susceptible to this type of local reaction, and are affected only by a general immunity either resulting from repeated parenteral migration of the larvae or gradually built up by the slow absorption of antigenic material picked up by tapped blood or lymph vessels. Those which feed on intestinal contents would presumably stimulate no immune reaction whatever the readiness with which resistance is acquired to such worms as *Ascaridia* and *Heterakis* suggests some dependence on host tissue throughout the lives of the worms.

8 In *Trichinella* infections there are also two phases of immunity intestinal and parenteral. The intestinal phase develops first, is local

and confers a high degree of protection. The parenteral phase develops later is general, is manifested by eosinophilia and pruripitina, can be duplicated by vaccination, and has a relatively feeble protective action. The local functional immunity may be quite independent of the general serological reaction."

VAN DEN BERGHE (Louis) La schistosomose humaine dans la province de Stanleyville (Congo belge) [Schistosomiasis in Man in the Stanleyville Province.]—*Ann. Soc. Belge de Méd. Trop.* 1939 Dec 31 Vol. 19 No 4 pp 573-584 With 2 figs. & 4 plates [14 refs.]

The investigation covers journeys radiating from 6 centres in the Province of Stanleyville and considers also schistosome infection in the adjacent regions of Kenya, Uganda and the Anglo-Egyptian Sudan.

1 *Stanleyville* The author is unconvinced of the validity of *S. intercalatum* seeing that variations in the shape and size of the eggs barely exceed those well known for *S. haematobium*. Its local geographical distribution and its limit to the intestine seem to the author to justify its being placed in a subspecies.

2 *Bala* Hospital figures put the infection rate at 9 per cent. with *S. mansoni* and *S. haematobium intercalatum*.

3 *Niangara* Hospital figures put the rate at 5 per cent. all with *S. mansoni* while in 58 children 5 (9 per cent.) were infected. In the river Mangaka, an apparently favourable site for the mollusc hosts long repeated investigations revealed only seven *Planorbis adcocki* and from only one of them did schistosome cercariae emerge. From Niangara as centre one of his journeys took him to Doruma where WALKIERS discovered *S. faradji* [this Bulletin 1928 Vol. 25 p 845]. Of this van den Berghe writes that he found fixed on the wall of the dispensary there a water colour drawing by Walkiers where the eggs of *S. haematobium*, *S. mansoni* and *S. faradji* are represented as being of the same size and with no scale reproduced, from which he deduced that all indeed were of the same size. Beneath that of *S. faradji* Walkiers had written *oeuf sans éperon, miracidium très actif et foncé* [egg without spine, miracidium very active and dark] on which is made the comment that activity and coloration are characters without value here that many hundreds of examinations made in the region over ten years had shown no more eggs of this sort, and that the appearance must have been due to the spine having lain above or beneath typical *S. mansoni* eggs. In a region south of Niangara, densely forested, 50 children, though showing 73 per cent. of *Ascaris* and 81 per cent. of hookworm, showed no schistosomes nor could snail hosts be found there.

4 *Faradji* is densely populated and heavily infected with *S. mansoni* with as photographs show hepatic cirrhosis and a state recalling that of infection with *S. japonicum*. Of 402 persons examined in one village the percentage of cirrhosis was 8 in men, 9 in women, 17 in boys, 12 in girls, children under 4 years old not being examined yet no *Planorbis* was found, other snails were few and none of them emitted schistosome cercariae on dissection.

5 At *Djugu* itself (it lies at a height of 1,800 metres) there is no indigenous case of infection. On the western bank of Lake Albert at a height of 620 metres the infection is heavy at Mahagi all children examined had the eggs of *S. mansoni* in their stools visceral infection

with ascites was common and a European became infected after bathing in the lake there on one occasion only

6 At Iruwen 900 metres infection with *S. mansoni* is widespread and grave, and many have intestinal infections with *S. haematobium* var. *intercalatum*. Planorbis is abundant near here and between 40 and 50 per cent. at Buta emitted cercariae. Of 50 Pygmies of Efe race 11 per cent were infected with *S. mansoni* and a long search discovered one *Planorbis adowensis* which was found infected with the cercaria of *S. mansoni*. Infection in the adjacent Kenya Uganda and Anglo-Egyptian Sudan is touched on. C L

i ALCAY (L.) MARILL (F. G.) MUSSO (J. C.) & CASTRYCK (R.) Première enquête sur le foyer de bilharziose vésicale de Saint Aimé-de-la-Djidlouia (Oran) [First Inquiry into a Focus of Vesical Bilharziasis in Saint-Aimé-de-la-Djidlouia.]—*Arch Inst Pasteur d'Algérie* 1939 Sept Vol. 17 No. 3. pp 421-428. With 3 figs. on 2 plates.

ii MARILL (F.) ALCAY (L.) & MUSSO (J.) Un cas algérien de bilharziose intestinale autochtone [An Autochthonous Case of Intestinal Bilharzial Infection in Algeria.]—*Bull Soc Path Exot* 1939 Oct 11 Vol. 32. No. 8. pp 822-823

i A further note on the discovery reported [this *Bulletin* 1940 Vol. 37 p 150] of infection by *S. haematobium* in Saint Aimé-de-la-Djidlouia.

ii At this place 1 of 15 faecal examinations disclosed eggs of *S. mansoni* C L

MOZLEY (Alan) The Fresh-Water Molluscs of the Tanganyika Territory and Zanzibar Protectorate, and their Relation to Human Schistosomiasis.—*Trans Roy Soc Edinburgh* 1938-1939 Vol. 59 Pt 3. No. 26 pp 687-744 With 10 figs & 3 plates [21 refs]

The work reported was carried out in 1937/38 and the author of this monograph considers the East African mollusca in relation to human schistosomiasis, giving a systematic account of the molluscan fauna their distribution as affected generally and locally by earth structure climate vegetation, soils flood drought geomorphology light food chemical conditions and temperature and the means of their control. The results of local surveys are stated.

S. haematobium is found throughout the area *S. mansoni* is found widely on the mainland but is not native to Zanzibar and Pemba, and from 10 to 70 per cent of the population harbour these flukes. The local intermediary of the latter is *Biomphalaria pfeifferi* and of the former probably *Physopsis globosa* though 24 other species of fresh-water molluscs are known to occur. As a result of the varying conditions above noted that govern snail distribution that of the undesirable snails is limited to a few only of the many ponds marshes lakes and streams and these molluscs could be exterminated in many places at small cost by draining flushing, poisoning and vegetation. As to the last, *P. globosa* is abundant where there is abundant growth of aquatic and semi-aquatic plants but if the service of the water is completely covered by plant leaves these snails are few and the best plant to effect this seems to be *Pistia stratiotes*. [It is the plant that furnishes air for the larvae and pupae of *Mansonioides* species the

is usually present even in cases with no clinical pulmonary symptoms whatsoever and that it becomes apparent about three months after infection.

The findings fall in then, with those reported in *S. haematobium* [this Bulletin 1937 Vol. 34 p. 394] The examinations were made on five Egyptian agricultural labourers.

We can differentiate between three main types of changes which however may be combined with one another

- a. Focus formation (the size of a millet seed to that of a bean)
 - b. Increase in number and density of the normal lung structures mostly found in the beginning and when the pulmonary process is disappearing
 - c. Enlargement and intensification of the hilar shadow
- Particularly characteristic are the following types —
1. Miliary pulmonary balharzias.
 2. Net or honey comb design of the lungs.
 3. Birch-broom lungs

Antimony therapy appears to be without any influence upon the course of the fever of the secondary stage and upon the development of the pulmonary changes, in any case if the therapy is started at the onset of the secondary stage and if we use doses such as those effective in the treatment of the chronic tertian stage [See also this Bulletin 1933, Vol. 33 p. 693]

C L

BARDOUM (M. L.) Bilharzial Myelitis.—*Jl Egyptian Med Assoc* 1939 Aug Vol 22 No 8 pp 457-461 With 2 figs.

A case of bilharzial myelitis has been described. It is the only case in which bilharzia ova have been definitely recognised (either in scrapings or in histological sections) in other parts of the body namely bladder ureters and seminal canals.

After a consideration of literature, a patient is considered who died a month after admission to the Hase el Amr hospital with symptoms of a transverse lesion of the spinal cord. His urine contained no blood or ova and the cerebrospinal fluid was clear without excess of cells. Examinations of the stools or rectum are not reported. Autopsy showed a fusiform swelling at the lower end of the spinal cord with calcified bilharzia ova in it and in the nerve roots. There were sandy patches in the trigone of the bladder and along the whole length of both ureters and scrapings from these and from thickened and scarred seminal vesicles disclosed bilharzial ova. [The report by HOFF and SMADY (this Bulletin 1940 Vol 37 p. 147) bears comparison]

C L

PAKAYOTATOU (Angélique) Sur deux nouveaux cas de "bilharziose vésicale" (*Schistosoma haematobium*) guéris par l' "Antiomonalate de Lithium" à Alexandrie d'Egypte 1937 [Two Cases of Vesical Schistosomiasis treated by Antiomonaline].—*C R Soc Méd et Hyg Trop d'Egypte* 1937-1938. Vol. 9 pp. 111-114

Two cases of urinary infection with *Schistosoma* were cured in 1937 with antiomaline. One patient a boy of about 9 had 20 cc. in all of the drug. The other a girl of 11 had 30 cc and was then "sterile" as far as eggs go. The date of the meeting to which the report was communicated bears a date 9 days after the last injection.

C L

ALCAY (L.) MARILL (F.) & MUSSO (J.) Les réactions de floculation au cours de la bilharziose humaine (Note préliminaire) [Flocculation Tests in Human Schistosomiasis].—*Bull Soc Path Exot* 1939 Oct 11 Vol 32. No 8 pp 836-842.

This paper is noticed here by title only since it is a preliminary note and the authors state that definite conclusions cannot yet be drawn and propose to publish the results of further work. It would be helpful if they would give the details of the tests used instead of the names of those who devised them since it is difficult to trace the modifications constantly being introduced by the workers referred to. For instance Gaté's test appears to be a formol-gel test but the details may not be familiar to all British readers. C W

MAINZER (F.) & KRAUSE (M.) Changes of the Electro-cardiogram appearing during Antimony Treatment.—*Trans Roy Soc Trop Med & Hyg* 1940 Jan. 29 Vol 33 No 4 pp 405-418 With 5 figs. [15 refs.]

In twelve bilharzia patients the development of the electro-cardiogram was followed up during a course of tartar emetic treatment.

In seven cases considerable alterations were found changes of the S-T interval as well as of the T deflection. The tracings which had in all the cases been absolutely normal assumed a markedly pathological character in three cases. In the other four cases the picture suggested the suspicion of a disturbed heart action. In three persons the electrocardiogram remained unchanged, in two further cases the changes were insignificant.

The extent of the electrocardiographic changes was parallel to the degree of chronic bradycardia due to the effect of antimony. In contradistinction to the view held hitherto the persistent antimony bradycardia differs in its electrocardiographic characteristics from the slowing of the pulse rate due to vagal stimulus. In two patients in whom the electrocardiogram was considerably changed no bradycardia occurred.

The electrocardiographic abnormalities as well as the bradycardia are therefore considered as resulting from intoxication of the heart muscle through therapeutic antimony administration, though the process in most cases is not clinically evident. In exceptional cases the condition may result in sudden death, through auricular fibrillation.

BONNE (C.) & SANDGROUND (J. H.) Bilharzia japonicum aan het Lindomeer [*S. japonicum* Infection round Lake Lindoe Celebes.]—*Geneesk Tijdschr v Nederl Indië* 1940 Feb 20 Vol 80 No 8. pp 477-481

Eggs of bilharzia japonicum were demonstrated by a technique of concentration in 93 out of 178 inhabitants of the villages on the shore of Lake Lindoe in Central Celebes, belonging to a very primitive tribe of Toradjas. Dysenteric symptoms caused by bilharzia were absent. Only one stool with blood and mucus was seen which was obviously due to amoebiasis.

Many huge spleens reaching in certain cases beyond the umbilicus were observed. It remains uncertain whether they were the result of the bilharzial infection or due to malaria which was also present.

No naturally infected snails were discovered and experimental infections could not be obtained by exposing various snails to the miracidia escaping from the schistosome-eggs in the stools.

A list of snails from the shores of Lake Lindoe identified by BEQUAERT is added. Only a few specimens of No. 12, a snail related to *Blanfordia nosophora* (Roxson) were present in our collections.

BARTSCH (Paul) A New Intermediate Host of the Asiatic Blood Fluke
Schistosoma japonicum Katrutsa.—*Chinese Med J* 1939
 Aug Vol. 56 No. 2 pp 171-172.

The snail was sent to the U.S. National Museum by Y T YAO for identification, where it was named *Oncomelania yaoi* n. sp. It was collected at Wang Ling Huang, Pingyang Hsien in the central part of Kiangsi Province China. The find extends the known range of the genus considerably further north. The evidence that it is an intermediate host of *S. japonicum* is not recorded. C L

KATO (Tatsuo) Method of collecting Cercariae of *Schistosomum japonicum* and Report of Experiment in Inoculation.—*Kioto Arch Experim Med* 1939 Nov Vol 16 No. 4 pp. 340-342.
 With 2 figs. on 1 plate.

Washed Blanfordia snails are set under water in the light, but not in direct sunlight at a temperature of over 16°C. When cercariae emerge and attach themselves to the surface film this is looped off and the cercariae transferred to a slide or watch glass. The loop used was of horsehair or palm leaf bark fibre. When 50 cercariae were transferred to shaved rabbit skin the number of adults that developed varied from 1 to 9. C L

WISCONSIN STATE OF COMMITTEE ON WATER POLLUTION 1939
 July—Progress Report on the Chemical Treatment of Lakes and Streams with Special Reference to the Origin and Control of Swimmers Itch. [Summary taken from *Public Health Engineering Abstracts* Washington, 1940 Jan. Vol 20 No. 1 p. 19 Signed L. P. WARRICK]

In order to give attention to control of algae and other aquatic growths responsible for nuisances and occurrences of swimmers itch, an inter-departmental Committee on Chemical Treatment of Lakes and Streams of the State Committee on Water Pollution of Wisconsin was established to study problems involved and develop a suitable control program for the State to take care of all interests involved. The objective of the work carried out during 1938 and 1939 has been to suppress by chemical treatment those algae growths responsible for odor nuisances, tastes in water supplies from surface sources, interference with certain manufacturing processes, and troubles encountered in some recreational areas, especially where schistosome dermatitis (swimmers itch) has been experienced. The progress report outlines problems involved reviews legal provisions, summarizes the results of studies to determine the effect of various chemicals on fish life, and describes results obtained in demonstrations of treatment methods that have been conducted under the direction of the committee. The use of copper carbonate for eliminating snails harbouring cercariae from recreational bathing areas is advocated. Methods for applying the chemicals are described. Further studies are advocated to place the treatment on a more scientific basis, and appended is the form of permit and report on treatment used by the committee in providing general State supervision over chemical treatment of lakes and streams. [See also this Bulletin, 1940 Vol 37 p. 149]

Hsü (H F) Studies on the Food and the Digestive System of Certain Parasites. V On the Food of Liver Flukes.—*Chinese Med J* 1939 Aug Vol 56, No 2 pp 122-130 With 2 figs. on 1 plate [15 refs.]

The method of study was by serial sections of *F. hepatica* *D. dendriticum* *C. sinensis* and *Metorchis orientalis* taken from the bodies of animals. The material found in the intestine is taken to be their food.

Fasciola hepatica takes an enormous amount of blood cells *Clonorchis sinensis* mainly epithelial cells and inflammatory products *Metorchis orientalis* more blood cells than epithelial cells and *Dicrocoelium dendriticum* inflammatory products epithelial cells and red blood cells. The last mentioned species shows, furthermore, an extra intestinal digestion in the mouth cavity of its oral sucker "

[It will not be assumed that undigested residue is the part of its food which nourished a parasite. The digested part that on which it lives, presumably exceeds the residue in bulk. Where there is so much cellular matter there must also have been plasma and lymph]

C L

GALLIARD (Henri) Recherches sur l'étiologie de la distomatose hépatique au Tonkin [On the Aetiology in Tonking of Infection by *Clonorchis sinensis*].—*Ann de l'Ecole Supérieure de Méd et de Pharm. Indochine* 1938 Vol 2, pp 96-103 With 3 figs. on 3 plates. [15 refs.]

Investigations on infection with *Clonorchis sinensis* dealing with the distribution of the molluscan hosts in Tonking and in part of Annam.

The species concerned are in the Delta *Bufo chinensis* which is very common *B. longicornis* far rarer and *Melania tuberculata* in the high country *M. variabilis* and in all parts *Vivipara polyzona* and *V. quadrata*. By its very numbers and its general receptivity of trematode infection *B. chinensis* of which 4 of 600 were found infected is the most important mollusc host in the Delta and its absence from the higher regions explains their freedom. Infection was found in 1 of 250 *M. tuberculata* examined. Metacercariae have been found in *Cueller brevicauda* and in places infection presumably occurs in *Carassius auratus* the classic host and in *Anabas scandens*. Apart from the distribution of snail hosts the habit of eating raw fish is an important factor in spreading infection for it is common in Tonking but rare in North Annam where *B. chinensis* abounds.

C L.

MIYANAGA (Sukio) Studies on Second Intermediate Host of *Clonorchis sinensis* in Mukden Area.—*Jl Oriental Med* 1939 Sept. Vol. 31 No. 3 [In Japanese pp. 565-568 With 3 figs. on 2 plates. English summary p. 43]

Of 15 species of fish examined in the Mukden area of Manchukuo 6 were found to contain cysts of *C. sinensis*. The numbers of fish the number of grams of muscle and the average number of cysts per 100 grams were —*Carassius auratus* 114 1,226 1.7 *Hemiculter clupeioides* 49 51 6 *Leucogobio herzensteini* 288 133 183 *Pseudogobio rivicaris* 15 27 3.3 *Pseudorasbora parva* 240 205 134 *Rhodens notatus* 7 2, 125

C L.

KATO (Konroku) Experimentelle Untersuchungen ueber die therapeutische Wirksamkeit von zwei neuen Antimonpraparaten auf die Kaninchenclonorchiasis im Vergleich mit der des Stibnals und Brechweinsteins. [Observations on Two New Antimony Preparations on Clonorchis Infection of Rabbits compared with that of Stibnal and Tartar Emetic.]—*Okayama Igakkaï Zasshi (Mitt. d. Med. Gesellsch. z. Okayama)* 1940. Jan. Vol. 52. No. 1 [In Japanese pp. 51-64 With 5 figs. [22 refs.] German summary pp. 64-65]

The two new preparations were foudadin and Sizze A their action in reducing eggs and retarding development of young flukes was better than that of the older preparations. C L.

KINUGASA (Masaru) Investigations on the Incidences of Lung Fluke Disease (*Paragonimus westermani*) in Sinitiku Prefecture. II. On its Incidences in the Population in Sinitiku Prefecture.—*Tamook Igakkaï Zasshi (Jl. Med. Assoc. Formosa)* 1939 Oct. Vol. 38. No. 10 [In Japanese pp. 1445-1450 English summary pp. 1450-1451]

Of 5 150 persons examined, 232 or 4.5 per cent were found infected, the percentage varying from 0.33 in Sinitiku city to 8.09 in Dainampo in Tiku-nan District. The rate has fallen compared with that got by MATSUO and YOKOGAWA 20 years ago. The author associates high rates with probable consumption of crabs, raw or salted. For that procedure are held responsible the higher rates in the Takasago and Cantonese than in the Fukienese, in males who take salted crabs to get up a thirst for a drink than in females, and in Buddhist monks who class crabs neither as fish nor animal and so as eatable by them.

C L.

RO (Shintoku) On the Size and Form of Normal Eggs of the Lung Fluke (*Paragonimus westermani*).—*Acta Japonica Med. Trop. Formosa* 1939 Dec. Vol. 1. No. 2. pp. 303-308 With 20 figs. on 2 plates.

BONNE (C) Eenige verdere waarnemingen over echinostomiasis. [Further Observations on Echinostomiasis].—*Geneesk. Tijdschr. v. Nederl. Indië* 1940. Feb. 27. Vol. 80. No. 9. pp. 537-548 English summary

I. Reports on 6 autopsies of natives in whom *Echinostoma ilocanum* was incidentally discovered. All of them were patients of the same agricultural colony for insane males. The worms are present in the jejunum, sometimes in large numbers (maximum 180). The cause of death was quite independent from the echinostomiasis.

Report on one autopsy of an old Javanese woman who had never been insane and proved to be a carrier of echinostomes. This was the first case discovered on Java without any connection with the above mentioned colony.

II. The first intermediate hosts in Celebes (Lake Lindoe) are two planorbid snails *Anisus sarasinorum* Bollinger and *Anisus converdusculus* Hutton.

"In Celebes the snail *Viviparus javanicus rudipellis* P. & F. Sarasin acts as second intermediate host but the most important carriers of metacercariae with regard to human echinostomiasis in Celebes are two

species of mussels *Corbicula linduensis* Bollinger and *Corbicula subplanata* v. Martens. All the identifications of molluscs are by BEQUAERT.

III. In Java similar infected molluscs can be found. A number of *Corbicula* species live in streams and ponds but never in such enormous quantities as in Lake Lindoe in Celebes. They are occasionally consumed in boiled condition by the native population. Infestation with echinostome-metacercariae is very common in certain species and uncommon or absent in others. Further detailed studies on this subject are necessary. The snails in the ricefields of Western Java (*Pila Viviparus* Lymnaea, *Anisus*) are practically 100 per cent. infected in certain localities, as described already by SANDGROUND. The adult echinostomes developing from the mussel metacercariae in Java are undistinguishable from those developed from snail-metacercariae in Java.

IV. In man the main symptoms of the Celebes-type of echinostomiasis are diarrhoea and slight pains in the bowels. In experimental human infections the diarrhoea disappeared a few weeks after the infection became established. Eosinophilia rose to 38 per cent. 5 weeks after the infection but came down to normal a few weeks later. In the meantime a large part of the worms present had been expelled. Human infections are not transient worms being still present and producing eggs 7 months after the experimental infection.

V. BONNE and SANDGROUND mentioned a winged tail cercaria from *Anisus sarasinorum* in Lake Lindoe in Celebes, which they accepted as the cercaria of the Lindoe echinostomiasis in man. No direct proof was possible. Sandground describes shedding of echinostome cercariae in naturally infected *Anisus convexusculus* in Java. They were cercariae with unwinged tails. No winged tail cercariae have been observed in naturally infected *Anisus convexusculus* in Java. Experimental exposure of *Anisus convexusculus* to miracidia of Celebes echinostomes resulted in a single instance in production of redia containing winged tail cercariae which strengthens the probability that the winged tail cercariae in *Anisus sarasinorum* from Lake Lindoe really represented a developmental stage of the human echinostome from that region. Further confirmation seems desirable.

BONNE (C) & SANDGROUND (J. H.) Echinostomiasis in Celebes veroorzaakt door het eten van zoetwatermosselen. [Echinostome Infection in Celebes as a Result of eating Mussels.]—*Geneesk. Tijdschr. v. Nederl. Indie* 1939 Aug. 22. Vol. 79 No. 34 pp. 2116-2134 (3016-3034 etc) With 14 figs. on 4 plates. English summary.

4. further investigation on the echinostome infection reported by BRUG and TESCH [this *Bulletin* 1938 Vol. 35 p. 218] about Lake Lindoe in Celebes.

The writers spent 11 days by this lake in studying the local bilharzial and echinostome infections and report on the latter. They examined the available stools of the populations of three villages and found respective percentages of infection of 96, 44 and 24. The infections were heavy as shown by tetrachlorethylene treatment for as many as 200 flukes were brought away in the first of the subsequent stools. It is thought that the worm, though near *E. malayanum* Leiper 1911 may perhaps be a new species. "By a process of exclusion, the observation of cercarial development as well as by other evidence it is held that a small planorbid snail (not yet identified) serves as the primary molluscan host. 417 mussels taken from the lake close to the heavily infected village have been found carrying large numbers of echinostome metacercariae. These mussels appear prominently in

the daily diet of the local population. They are eaten after passing through a primitive boiling process," and on being administered to laboratory bred rats and mice and eaten by the two authors have produced echinostomes of the kind occurring in man locally. "Reservoir hosts" could not be found. C. L.

VAREZ-COLLEY (Ann) & AYEREA (Candido M.) Determination of the Piscine Intermediate Hosts of Philippine Heterophyid Trematodes by Feeding Experiments. Progress Report.—*Philippine J. Sci.* 1939 Oct Vol. 70 No. 2 pp 201-215 With 4 plates. [20 refs.]

MALARIA.

PRÉCIS OF ABSTRACTS IN THIS SECTION

LEPPI (p. 494) gives an account of malaria and mosquitoes in Bessarabia.

FARINAUD and PROST (p. 494) writing of the hyperendemic conditions in the valleys of part of Cambodia, in which *A. sinensis* is ubiquitous, and in which the population is declining largely owing to malaria, advocate removal of the people to the higher ground where water is less abundant. Malnutrition due to primitive agriculture and to soil erosion is now universal. In the meantime drug treatment of children appears to be beneficial. GUNASEKARA (p. 495) reports that low parasite rates were found in a survey of Ceylon, even in hyperendemic parts of the Island, but especially in the wet zones. *P. malariae* showed the highest prevalence. EASTLE (p. 495) reports on the epidemiological features of malaria in Porto Rico, which is not a hyperendemic area. The maximum spleen rates are in the 10 to 20 age group, but all ages suffer from a considerable amount of illness and local epidemics are common. CROES (p. 496) describes the extent of malaria infection in the cantons of part of Madagascar. FRATAXI (p. 496) describes the high prevalence of malaria due to excessive rainfall in part of Oran in 1937.

SENTOV (p. 497) quotes evidence which indicates that sporozoites of *P. ovale* have a greater power of developing and multiplying in the human body than have inoculated trophozoites of the same species.

BERTRAM and GORDON (p. 497) report on an insectarium with constant temperature and humidity control, and on the rearing of *A. maculipennis atroparvus*. GEBERT (p. 498) describes a simple apparatus for maintaining mosquitoes alive under conditions of adequate humidity in dry tropical conditions. BORD (p. 498) reports that the maintenance of *A. quadrimaculatus* for 7 years in the laboratory has not altered its susceptibility to *P. vivax*.

PICOT (p. 498) traces the history of the introduction of *A. gambiae* into Brazil from W. Africa and of the resulting pandemic of malaria which occurred in 1938. The importance of ships and aeroplanes in the spread of this mosquito is referred to and the conditions which favour breeding are briefly mentioned. LE GAONACH (p. 500) shows that *A. sergenti* is found as far as the central Sahara. The only anopheline found infected in an area near Calcutta by ROY (p. 500) was *A. culicoides*.

AFRIDI *et al* (p 500) show that in three villages near Delhi the percentage of anophelines containing human blood varies inversely with the proportion of cattle to human population.

TRY (p 501) gives results with the Wassermann and Vernes tests in malaria which lead him to the conclusion that in malaria endemic areas syphilis can only be diagnosed after repeated tests by more than one method. In discussion, however MASSIAS states that no infection other than syphilis can give a positive Wassermann. MATSUNOBU (p 502) shows that the haemopoietic function is increased during the febrile period of malaria, sinks to normal in the afebrile interval and increases again during convalescence.

FONDÉ and FONDÉ (p 502) describe the reactive and the non reactive forms of chronic malaria in the latter of which the defensive powers are exhausted. The manifestations may simulate almost any disease. Prolonged treatment is necessary and in the non-reactive cases specific drugs should be used with caution and general treatment employed, but this cannot be standardized.

CHOPRA *et al* (p 503) found that M & B 693 4 gm. daily for 5 days controlled the symptoms in a few cases of *P. vivax* and *P. falciparum* malaria and caused the disappearance of parasites.

MANCA (p 503) reports favourably on manganese iodo-mercurate in the treatment and prophylaxis of malaria, giving figures of those treated and the controls. CHOPRA and BASU (p. 505) however report disappointing results with this drug in prophylaxis.

FAIGUENBAUM (p 504) reports favourably on the Ascoli treatment in 126 cases of chronic and 9 of recent malaria. DIAMANTI (p 504) reports on a few patients treated by this method.

RUSSELL and KNUPE (p 504) state that weekly spraying of houses reduces the transmission of malaria to a marked extent but the cost is relatively high for the villages concerned.

BANERJEA (p 505) shows that the periodical flushing of drains due to the rapid fluctuations in the level of the water in the Gumti weir Lucknow sweeps away the anopheline larvae.

DANILOVA and BUDURAKO (p 505) refer to the antilarval properties of acidol a product of petroleum distillation which is highly toxic if the temperature of the water is above 17°C. which is necessary for film formation.

In *Public Works* (p 505) is an account of a Paris green of a maximum particle size of 2μ which floats longer than the usual preparation and may even float just below the surface of water. It is more efficient and economical than regular Paris green. SERGUEV *et al* (p. 506) describe the mechanism and efficiency of a motor pulverizer for spreading a Paris green and kaolin dust. RUSSELL and JACOB (p. 506) report on the prevention of mosquito breeding in casuarina pits. Paris green is successful against *Anopheles* but not *Culex*, if applied every 6 days or less. *Gambusia* is effective, but naturalistic methods fail.

Malaria of birds and monkeys—CAUSEY (p. 507) found that injection of the blood of a duck infected with *P. cathemerium* into splenectomized and non-splenectomized canaries produced infection only in the former but that the blood of an infected canary produced infection in both. He regards this as due to the action of the spleen in removing foreign red blood cells rather than to a destructive action on the parasites. HEGNER and DOBLER (p. 508) show that passive immunity of a low

order may be transmitted by the injection of serum or spleen emulsion of canaries infected with *P. californicum*.

HERMAN and GOLDFARB (p. 508) show that splenectomy has no influence on the degree of infection produced in chicks by *P. circumflexum*. MAXWELL and GOLDSTEIN (p. 508) discuss the immunity produced by different strains of *P. circumflexum* which though more markedly homologous, is frequently reciprocal.

WOLFSON (p. 508) discusses *P. velutum* in canaries and ducks. MAXWELL and VOTER (p. 509) describe the characters of *P. nucleophilum*.

FULTON (p. 509) shows that glucose, laevulose, maltose, mannose and especially glycerol are oxidized by *P. knowlesi* in culture, and that the blood sugar and liver glycogen levels of heavily infected animals are low. RODHAIN and LASSMAN (p. 509) show that *P. gonderi* unlike *P. knowlesi* and *P. cynomolgi* has a marked tendency to infect reticulocytes.

C IV

LEPSI (I) Sur quelques moustiques et sur la malaria en Bessarabie. [Certain Mosquitoes and Malaria in Bessarabia.]—*Bul. Mus. region. Bessarab. Chişinău* 1938 No. 9 pp. 47-71 [Summarized in *Rev. Applied Entom.* Ser. B. 1940 Jan. Vol. 23 Pt. 1 p. 9].

An account is given of further investigations on Anophelines and malaria in Bessarabia, carried out in 1936-38. Observations on other mosquitoes are also included. Of the hibernating mosquitoes collected in cellars in the town of Chişinău, *Culex pipiens* L. was again the predominant species, its ratio to *Anopheles maculipennis* 31g averaging 240:1 for the two years. In all, only 28 examples of *A. maculipennis* were taken and more than one seldom occurred in a cellar. Figures are given showing the numbers of cases of malaria due to *Plasmodium vivax*, *P. falciparum* and *P. malariae* during the years 1932-38. *P. vivax* was predominant, but the numbers due to *P. falciparum* are unusually high for an area where the sole vector is *A. maculipennis*. As 5-8 per cent. of the population of the town still suffer from malaria, the author concludes that its incidence has not decreased, in spite of a certain amount of reclamation work that has been carried out in the swamps of the Bâc.

Observations in 13 villages in a district bordering on the marshes of the Bâc showed that malaria became less common as the villages were situated further from the marshes, which afford numerous breeding places for *A. maculipennis*. Of the Anophelines taken in houses in a town in the delta of the Danube in July-September 1938, *A. hyrcanus* Pall. was more numerous than *A. maculipennis* but neither was abundant. The malaria index for 1924-38 averaged only 1.7 per cent., and almost all the cases were infected by *P. vivax*.

FARINAUD (M. E.) & PROST (P.) Le paludisme chez les Phnongs. Notes de démographie et d'épidémiologie. [Malaria among the Phnongs. Demography and Epidemiology.]—*Ann. de Méd. et de Pharm. Colon.* 1939 July-Aug-Sept. Vol. 37 No. 3 pp. 764-780. With 1 chart.

Upper Chlong inhabited by the Phnongs, is a part of Cambodia which is continuous with both Annam and Cochinchina. It covers an area of 14,000 square kilometres and comprises three more or less well defined areas, a plateau 700 to 800 metres high, an intermediate region 500 to 700 metres high, and a low lying region 100 to 500 metres

high. There is a short dry season, December to March and a rainy season April to November. In the valleys in which the native villages are situated there is everywhere an abundance of clear running water. *A. minimus* is ubiquitous. The Phnong population of this large area numbers only 9,570—3,386 men 2,338 women and 3,846 children. The population is steadily decreasing and for this hyperendemic malaria is chiefly responsible. Other communicable diseases are of little importance. All infants are infected with malaria in the first year of life. Infant mortality is terribly high 30.8 per cent. Malnutrition is universal. Insufficient crops dependant upon primitive agriculture in clearings and subsequent soil erosion coupled with a disinclination or inability for hard manual work explain the malnutrition. Remedial measures would necessitate the removal of villages from mosquito infested valleys to the plateau. Pregnant women and children need special care. In an experimental group of 9 villages progress has been made in the latter direction. All sick infants and children have been treated with quinine. In 1938 in these villages there were 18 births and only 9 deaths.

Norman White

CEYLON ADMINISTRATION REPORT OF THE DIRECTOR OF MEDICAL AND SANITARY SERVICES FOR 1938 [GUNASEKARA (S. T.)]
[Malaria pp C33-C38.]

During February and March 1938 school-boys from all parts of Ceylon to the number of 144,873 were examined for enlargement of the spleen. Blood films were taken from some ten per cent of these boys 14,653 in all, and examined for parasites. A hundred fields of the thin film and twenty fields of the thick smear were examined in each case. The period February-March marks the declining stage of the annual malaria recrudescence over the greater part of the Island. Parasites were found in 664 a parasite rate of 4.5 per cent. as compared with 13.5 in 1921. The distribution of quinine to school-children was stopped one month before the survey. The rates were very low even in hyperendemic parts of the Island. Almost everywhere the quartan parasite was most in evidence the percentage prevalence of the three species being *P. malariae* 49.7 *P. falciparum* 34.2 and *P. vivax* 19.1. Mixed infections explain the fact that the sum of these percentages exceeds 100.

With regard to rainfall the Island comprises three well defined zones wet intermediate and dry. The parasite rates of these three zones were 0.9 5.5 and 7.7 per cent. Corresponding spleen rates were 4.9 26.1 and 36.6. The spleen rate for the whole Island was 21.2 per cent. as compared with 28.3 in 1937 and 30.6 in 1936.

N. IV

EARLE (W. C.) The Epidemiology of Malaria with Special Reference to Puerto Rico.—*Puerto Rico Jl Public Health & Trop Med* 1939 Sept Vol. 15 No 1 pp 3-27 With 4 charts. [Spanish version pp 28-43.]

The author considers that the literature of the epidemiology of malaria is dominated by the views of those working in hyperendemic areas. Malaria is also a serious problem in other conditions. For this reason a report on malaria conditions in Porto Rico where spleen rates over 60 per cent. are extremely rare, is of interest. Long time trends in malaria mortality are noted. Rates of from 3 to 4 per thousand are common. Local epidemics are of frequent occurrence. Annual attack

rates of 200 per 1 000 population characterize the more malarious parts of the island. About 40 per cent. of clinical malaria cases are caused by *P. vivax* 58 per cent. by *P. falciparum* and 4 per cent. by *P. malariae* and mixed infections. *P. vivax* is most in evidence from May to August, *P. falciparum* in December or January. Sickness caused by *P. vivax* is most frequent in the age group 5 to 9 years. *P. falciparum* causes most sickness in the 10 to 14 age group. In late years *P. falciparum* infections predominate. During acute illness *P. vivax* gametocytes are found twice as frequently as are gametocytes of *P. falciparum*. The average parasite counts of patients suffering from clinical malaria were *P. vivax* 1,529 *P. falciparum* 3,651 and *P. malariae* 534 per cmm. of blood. The maximum spleen rate was found in the age groups 10 to 20 years. Considerable illness is caused by malaria in all age groups and no group is a special source of mosquito infection.

N IV

CROS (R.) Indice splénique dans la circonscription médicale de Vatomandry (Madagascar). [Spleen Index in Vatomandry (Madagascar).]—*Bull. Soc. Path. Exot.* 1939 Oct. 11 Vol. 32 No. 8. pp. 813-816.

During a medical survey whose primary object was to ascertain the extent of leprosy infection in the region of Vatomandry in Madagascar advantage was taken of the opportunity to take note of the extent of malaria infection among the population as revealed by enlargement of the spleen. The author states that he obtained no evidence of the prevalence of other pathological conditions which cause splenomegaly. In all 8,114 individuals were examined during the latter half of the year which is less malarious than the first half. Of these 28 per cent. had enlarged spleens. The spleen index of 4,655 children, included in the above total, was 50-75 per cent. There was but little difference between the rates found in the coastal cantons which are flat and marshy and in the hilly interior cantons, respectively. There was, however very considerable difference between the rates of different individual cantons in both areas.

N IV

FRATANI (L.) Etude épidémiologique du paludisme à Beni Abbès (Sahara oranais) en 1937. [Epidemiological Study of Malaria in Beni Abbès, Oran, Algeria, in 1937.]—*Arch. Inst. Pasteur d'Algérie* 1939 Sept. Vol. 17 No. 3. pp. 429-437 With 1 map & 4 figs. on 2 plates.

Malaria in Beni Abbès, an oasis in the Oran Sahara, varies greatly in intensity from year to year being dependent, for the most part, on the rainfall in the catchment areas of the tributaries of the Saoura oued on the bank of which the oasis is situated. A spate in the autumn of 1936, and another at the end of August 1937 coupled with a condition of undernourishment of the population consequent upon a partial failure of the date crop were responsible for a high prevalence of malaria in 1937. There are also permanent anopheline breeding places, depressions in the bed of the stream, and some artificial breeding places dependent upon the methods of irrigation employed.

The population numbers about a thousand, for the most part a stable population. In September 1937 255 children from 0 to 15

were examined the spleen index was 41 the parasite index 70.9 per cent Of the parasites identified 76.1 per cent were *P. falciparum* and 8.7 per cent *P. vivax* the remainder were undetermined. Four species of *Anopheles* were found, *A. multicolor*, *A. hispaniola*, *A. sergenti* and *A. dithali* the last named is a recent discovery it is rare in the southern territory It breeds in slightly saline water From the clinical point of view the disease was not very severe. For financial reasons measures have to be confined to small scale antilarval measures and the treatment of the sick The fry of a local fish *Barbus figuigensis* though not as voracious as *Gambusia* are of use in the control of mosquito larvae

N IV

SINTOV (J. A.) Studies of Infections with *Plasmodium ovale*. III Resistance to the Inoculation of Sporozoites as compared with Trophozoites.—*Trans Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33 No. 3. pp. 305-318. [29 refs.]

Of 108 primary infections with *P. ovale* 88 were induced by blood inoculation and 22 by sporozoites. Evidence of resistance to infection indicated either by the failure or very low intensity of the parasitic infection or by the mildness of the clinical reaction was obtained in many cases inoculated with blood. No such evidence was forthcoming in the cases inoculated with sporozoites. The effects of reinoculations of patients who had acquired some resistance to *P. ovale* as the result of a previous induced infection with sporozoites and trophozoites respectively were compared. Of 19 reinoculations with trophozoites 15 failed to provoke detectable infections only 4 of 21 sporozoite reinoculations failed to infect The greater infective power of sporozoites as compared with trophozoites cannot be explained by dosage the numbers of sporozoites injected were less than the numbers of trophozoites. There was no evidence of the transference of any passive immunity with the blood inoculations The observations indicate that *P. ovale* sporozoites have a greater power of developing and multiplying in the human body than have inoculated trophozoites of the same species. [See also this *Bulletin* 1940 Vol. 37 p 183]

N IV

BERTRAM (D. S.) & GORDON (R. M.) An Insectarium with Constant Temperature and Humidity Control, together with a Description of a Simplified Technique for the Rearing of *Anopheles maculipennis* var *atroparvus*.—*Ann Trop Med & Parasit* 1939 Dec. 30 Vol. 33. Nos. 3 & 4 pp. 279-283. With 2 figs. & 3 charts

In the first part of the paper the authors describe a small room in the School of Tropical Medicine at Liverpool, in which they maintain nearly constant conditions of temperature and humidity The room has a volume of about 1 000 cu. ft. and did not prove very expensive to construct. A source of difficulty is the entrance of solar heat through the window It is possible to maintain a steady high humidity which is all that is required no arrangement is made for reducing humidity The room is used for maintaining stocks of many sorts of biting insects.

The second part of the paper describes a method of maintaining stocks of *Anopheles maculipennis atroparvus* in the insectary In

essentials Bates's method is used. This entails making a rather thick suspension of soil and adding it to the breeding bowl at frequent intervals. The method appears to be simple and highly successful.

P A Baxton

GERBERT (S.) A Small Apparatus for the Experimental Infection of Adult Mosquitoes and their Subsequent Breeding.—*Trans Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33 No. 3 pp. 353-356 With 1 fig

When anophelines are infected with malaria experimentally they must frequently be kept alive for 3 or 4 weeks or longer this necessitates keeping them in an atmosphere sufficiently humid, a matter which may present some difficulty more especially in a tropical summer. The author describes a simple piece of apparatus which he has found useful for this purpose. The cork of a 3 by 1 inch specimen tube is inserted transversely. Two V-shaped slots are cut on opposite sides of the lower half this slotted half is pushed down inside the tube leaving a space of $\frac{1}{2}$ in. between the cork and the bottom of the tube. When the mosquito is placed in the tube the mouth of the tube is closed with mosquito netting tied round the collar. When the mosquito has fed through the netting the space below the cork is nearly filled with water this can be done with a capillary pipette. A pledget of cotton wool saturated with water is placed on the netting this is saturated each afternoon. If the mosquito is to have no more blood meals, a few drops of honey smeared under the piece of cotton wool may provide the necessary food. The cotton wool should not be kept continuously moist. In this apparatus mosquitoes have been kept alive as long as 73 days

N IV

BORD (Mark F.) On the Susceptibility of *Anopheles quadrimaculatus* to *Plasmodium vivax* after Prolonged Insectary Cultivation.—*Amer J Trop Med* 1939 Nov Vol. 19 No. 6 pp. 593-594

A laboratory strain of *A. quadrimaculatus* has been maintained for seven years without any introduction of new stock during which time some 84 generations have been passed in an artificial environment. This environment has produced no change in the mosquito's susceptibility to *P. vivax*. Experiment showed that this susceptibility is very closely similar to that of wild *A. quadrimaculatus* caught in the vicinity of the Research Station

N IV

PINTO (Cesar) Disseminação da malária pela aviação biologia do *Anopheles gambiae* e outros anofelíneos do Brasil [The Spread of Malaria by Aircraft. Biology of *A. gambiae* and other Brazilian *Anopheles*.]—*Mém. Inst. Oswaldo Cruz* 1939 Vol. 34 No. 3 pp. 283-430 With 35 figs. & 63 plates. English summary pp. 342-344

1 *Anopheles (M.) sayi* *gambiae* a species peculiar to the African Continent has been introduced into America (State of Rio Grande do Norte Brazil) between August, 1928 and February 1930

2 The introduction of this *Anopheles* into Brazil (Natal city near the seashore) must have been realized through ultra-rapid steamers, called *atouros* which cross the Atlantic from Dakar (Africa) to Natal (Brazil) in less than three days

3 The introduction of *Anopheles gambiae* into that sea port was made possible by lack of inspection on the part of the Sanitary Department of Ports which should have been made before the *avisos* touched at the port of Natal.

4 In 1931 there appeared a great malaria-epidemic, transmitted by *A. gambiae* in the district of Alcrim situated near the anchor-ground of these *avisos* in the harbour of Natal. This epidemic has not had any parallel as yet in Brazil in view of the great number of sick and fatal cases. This mosquito is undoubtedly the most dangerous to man since, besides transmitting the human filariasis (*Wuchereria bancrofti*) it infects itself by *Plasmodium* in the proportion of 82 per cent. the highest one ever observed, as shown by Nelson C. Davis (1932) in Natal (Brazil).

5 Eight years after the introduction of *Anopheles gambiae* into Brazil during the summer of 1933, there appeared a malaria pandemic in the regions of Rio G. do Norte and Ceará infected by this mosquito, attacking nearly forty thousand persons, and killing more than 20 thousand. During these eight years *Anopheles gambiae* spread out to the Northern part of Brazil, reaching State of Ceará, where it has been found in fifty-five localities.

"6 From what is known about the geographical distribution of *Anopheles gambiae* in Africa it is to be feared that this *Anopheles* may spread over all the American Continent covering not only the hot regions but also the cold ones.

7 The localities, situated near the sea-shore as for instance Arara Branca, State of Rio G. do Norte visited by airplanes of Commodoro-type may contribute to the dissemination of *Anopheles gambiae* transported by airplanes if these are not submitted to fumigation through the medium of appropriate insecticides as is being done in the United States with the airplanes coming from South America.

8. The morphological study which I have made in Natal (Brazil) of the whole life-cycle of *Anopheles gambiae* corresponds to the type-form of this *Anopheles* referred to by Miss A. M. Evans (1933) which is entirely independent of the variety *melas* which develops itself in water of high salinity as has been very well studied by Barber & Olinger (1931) in a certain region of the African Coast.

9 The *Anopheles gambiae* present in Brazil (State of Rio G. do Norte) develops itself easily in sweet water containing *Pistia stratiotes*. At temperatures between 21 and 30°C. in December the life-cycle is as follows —

a	Period of incubation of eggs	24 to 30 hours.
b	Larval period	10 to 14 days.
c	Pupal period	23 to 26 hours.

The food of larvae cultivated in the laboratory of Natal (Brazil) consisted of small particles of bread-crumbs and thoracic fragments of *Musca domestica* besides organic material coming from natural foci.

18 The larvae of *A. gambiae* of one day of age die at the end of four hours when put in a mixture of sea water (50 per cent.) + sweet water (50 per cent.). The larvae of three days of age also die at the end of four hours, when put in a mixture of sea water (30 per cent.) + sweet water (70 per cent.).

19 The most important breeding places of the larvae of *Anopheles gambiae* in Brazil consist of collections of sweet, stagnant and clear water exposed to the action of sunlight and covered by aquatic vegetation mostly represented by *Pistia stratiotes*.

The watering troughs for animals, the small pools formed on the bed of dry rivers, the wooden washing tubs, introduced into the soil and known as *olheiros*, the clay or wooden barrels introduced into the soil and used for the irrigation of plants cultivated in the kitchen-garden, the brooks of slow current near human dwellings, and the banks of lakes are important foci of *A. gambiae* in the North-East of Brazil."

COVA-GARCIA (Pablo). Notas sobre los anofelinos de Venezuela y su identificación. [The Anophelinos of Venezuela.]—*Publicaciones de la División de Malariología. Ministerio de Sanidad y Asistencia Social. Caracas.* 1939 Jan 15 No. 2. 34 pp. With 10 plates. [37 refs.]

LE GAONACH (J). Un foyer de paludisme au Hoggar (Tablet) [A Malaria Centre in Hoggar (Tablet)].—*Arch. Inst. Pasteur d'Algérie* 1939 Sept. Vol. 17 No. 3. pp. 438-441. With 2 figs on 1 plate.

Tablet is a small, poor village of recent construction in Hoggar a mountainous region of the central Sahara, about 1,500 metres above sea level, with a mostly negroid population of 130. Of 22 individuals, not suffering from fever and selected at random, and varying in age from 2 to 30, 17 were found to harbour malaria parasites, 8 *P. vivax* and 9 *P. falciparum*. The only anopheline found breeding was *A. gambiae* whose area of distribution thus extends as far as the central Sahara. N IV

ROY (D N). The Importance of *A. varuna* Lyaenger as a Carrier of Malaria in Bally (Calcutta).—*Jl. Malaria Inst. of India* 1939 Sept. Vol. 2 No. 3. pp. 239-242. With 1 chart.

Bally is a mill area near Calcutta about half a square mile in extent. The species of anophelines found breeding locally were *varuna*, *subscriptus* regis, *aximularis* ramseyi, *hyrcanus* var. *signatus*, *varuna* and *aximularis*. One adult *A. philippinensis* and two adult *A. pallidus* were also found. The number of adult females of all species dissected was 1,925. The only species found infected was *A. varuna*, 4 out of 113. All four had gland infections. Two were found infected in December and two in January. Malaria appears to be transmitted throughout the year. *A. varuna* does not appear to be a local vector of importance. The spleen index was 12.5 in 415 children examined. N IV

AFRIDI (M K.), JASWANT SINGH & HARWANT SINGH. Food Preferences of Anophelid Mosquitoes in the Delhi Urban Area.—*Jl. Malaria Inst. of India.* 1939 Sept. Vol. 2 No. 3. pp. 219-228.

During two successive malarial seasons anophelines were caught in catching stations in Delhi urban area and in three adjacent villages. The stomach contents of 8,314 females were examined by the precipitin test the sera used being anti-human, horse, pig, sheep and cow. There were 7,249 positive reactions. Of the four species examined *A. culicifacies*, *A. stephensi*, *A. subpictus* and *A. aximularis* only the first two were found to contain human blood and thus in but small percentage of the total examined. In the two years 5,029 *A. culicifacies* gave positive results with one or more sera of this number only 83.1-8 per cent. reacted with anti-human serum. Of 360 positively-reacting *A. stephensi* 5 were human-positive, 1.39 per cent. In the three villages the percentage of mosquitoes containing human blood varied inversely

with the proportion of cattle to the human population Only 39 *A. annularis* were examined all reacted positively with anti-cow serum
N IV

JUNIOR (Peregrino) Impaludismo e sistema reticulo endotelial.
[Malaria and the Reticulo-Endothelial System.]—*Africa Méd*
Lisbon 1939 Nov Vol 5 No 11 pp 219-228

This lecture deals with the histology physiology and pathology of the reticulo-endothelial system and the bearing of recent research concerning a cycle of development of Plasmodia in that system on our conceptions of the pathogenesis of malaria
N IV

MOSNA (Ezio) Contributo allo studio dell'immunità dell'infezione malarica. [Contribution to the Study of Malarial Immunity]—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol 2 Pt 2 pp 435-444 [14 refs.]

This paper was originally published in the *Riv di Parassit* 1938 Dec. Vol 2, No 4 pp 327-337 and was abstracted in this *Bulletin* 1939 Vol 36 p 927

TRI (H. T.) La réaction de Bordet Wassermann dans le paludisme [The Wassermann Reaction in Malaria.]—*Rev Méd Française d'Extrême-Orient* 1939 Oct. No 8 pp 1065-1068 [12 refs.]
[Summary appears also in *Bulletin of Hygiene*]

The author tested the sera of 246 malaria patients by the Bordet Wassermann and by the Vernes reactions the blood being taken when the temperature was normal and the patient fasting Twenty nine gave positive W.R. or 11.78 per cent. another four were doubtful and are disregarded thirty were positive with the Vernes test (12.19 per cent) and three doubtful The results of the former (Wassermann) test are given in more detail Of 97 with subtertian malaria four were strongly and another four weakly positive (8.2 per cent.) of 110 with benign tertian eight were strongly and five others weakly positive (11.8 per cent.) and of 39 with quartan malaria five were definitely and three weakly positive (20.5 per cent) the last thus giving a much higher proportion of positive reactions than either of the others The author concludes that in places where malaria is endemic Tonkung for example syphilis should only be diagnosed after repeated tests and by more than one method.

In the discussion which followed Dr Ch. MASSIAS combated the author's findings, or at least his interpretation of them. Examination of all patients coming to hospital, whatever the cause would give an equally high proportion of positives perhaps even higher examination of thousands of sera from patients attending for confinement revealed some 25 per cent. positive to the W.R. although they came for a normal act and not on account of any disease He stated categorically that in his (Massias's) experience malaria had no action whatever on the W.R. whether in the febrile attacks or in the afebrile intervals and that no infection other than syphilis can give rise to a

positive reaction, though another infection or trauma may reactivate a latent syphilitic condition. [See *Bulletin of Hygiene* 1939 Vol. 14 p 619]
H H S

MATSUNOBU (M) Beiträge zur Hämatologie der Malaria-kranken. IV Mitteilung Ueber die hämatopoetische Funktion von dem Gesichtspunkte von O_2 -Verbrauch der Erythrozyten und Retikulozytenzahl in Blut u. Knochenmark. [Oxygen Consumption of Erythrocytes, and Reticuloeytosis, in the Blood and Bone Marrow in Malaria.]—*Taiwan Igakkyo Zasshi* (Jl Med Assoc. Formosa). 1939 Nov Vol. 38. No. 11 [In Japanese pp. 1598-1595 With 2 charts. [13 refs.] German summary pp 1595-1596.]

Oxygen consumption of the red cells after two hours incubation in healthy persons was found to average 28.41 cmm. for men and 24.16 cmm. for women according to Warburg's method. In the stages of fever and convalescence it was increased to 34.28 cmm. and 29.63 cmm. respectively. In the fever-free interval it was 22.75 cmm. Reticulocytes in the peripheral blood and marrow were increased during fever and convalescence. In anaemias and other fevers it was found that increased oxygen consumption occurred where reticulocytes were increased. It was thus shown that the haematopoietic function is increased during malaria fever sinks to normal in the afebrile interval and increases again during convalescence, in both benign and malignant tertian infection.
C IV

FOXDT (George H.) & FOXDT (Edgar C.) Chronic Malaria. A Clinical Consideration.—*Arch Intern Med* 1939 Dec Vol. 64 No. 6. pp 1156-1169 [16 refs.]

The conception of chronic malaria in this paper is based on observations made during 42 years of active practice. Chronic malaria is not always easy to recognize—it tends to become asymptomatic. There are no geographic limits to chronic forms of malaria. Two clinical types may be recognized, reactive and non-reactive. In the latter the patient's defensive powers are exhausted—diagnosis is difficult. There is advanced organic degeneration. In making a diagnosis of chronic malaria the taking of an exhaustive history, a complete physical examination, specific drug tests and laboratory procedures are all important. In the atypical phase of the disease a clinically observed periodicity of seven to ten days is common. The manifestations of chronic malaria are so protean that the symptom complex of almost any disease can be simulated. The authors give a list of a number of conditions with which chronic malaria may be confused. Various clinical phases of chronic malaria are well described.

Both general and specific treatments are dealt with at some length. For the latter the authors favour alternate courses of atabrin and quinine. Prolonged treatment is necessary. Treatment is outlined for the attack period, a maintenance period and a consolidation period. In most cases it is necessary to extend the treatment of malaria over two to three years. In non-reactive cases specific drugs should be used with caution. The leucocyte count should improve after the administration of atabrin or quinine—if the leucocytes are decreased specific drugs should be withheld. The authors raise objections to standardized treatments of malaria.
A IV

CHOPRA (R. N.) HAYTER (R. T. M.) & SEN (B.) M & B 693 in Indian Strains of Malaria.—*Indian Med Gaz* 1939 Nov Vol. 74 No 11 pp 658-660

The authors have treated 12 cases of malaria with M & B 693 seven benign tertian four malignant tertian and one quartan. The drug was given in tablet form by mouth. Doses of 4 gm daily for five days controlled the symptoms of the disease caused the disappearance from the blood of sexual and asexual forms of *P. vivax* and of asexual forms of *P. falciparum*. When smaller doses were used recrudescences occurred within a fortnight. In the *P. malariae* infection parasites were still present in the peripheral blood two days after the completion of treatment this patient received only 1.5 gm. a day for five days. [See also this *Bulletin* 1940 Vol 37 pp 185-186]

N. W.

MANCA (Salvatore) Lo jodo-mercurato di manganese nella profilassi e nella terapia della malaria cronica recidivante [Manganese Iodo-Mercurate in the Prevention and Treatment of Chronic Relapsing Malaria].—*Riv di Malarologia* Ser. I 1939 Vol. 18 No 5 pp. 313-328. French summary [36 refs.]

Thirty five tuberculous patients suffering from chronic malaria and 30 non tuberculous chronic malaria patients were treated with M_2 (manganese iodo-mercurate). Ten healthy persons also received the treatment as a prophylactic. The drug was given in pill form on alternate days in the morning before any food was taken. The dose was progressively increased from one to eight pills. The patients were kept under observations for four months from the end of treatment. One hundred other patients in the sanatorium served as a control among these were six cases of primary malaria infection during five months June to October inclusive. Of the 35 tuberculous chronic malaria patients treated five had malaria relapses there were no relapses among the non tuberculous chronic malaria cases treated. The number of healthy individuals treated was too small to justify definite conclusions but the author states that the prophylactic action of M_2 is not immediate. Infection may occur during treatment. From the first to the sixth month after treatment the prophylactic value of the remedy becomes evident. The author believes that the action of the drug is on the reticulo-endothelial system and that there is no direct action on sporozoites. The tonic action of the drug on the non tuberculous chronic malaria patients was marked. The drug was well tolerated. [See also this *Bulletin* 1938 Vol. 35 p 31 and 1939 Vol. 38 p 262.]

N. W.

CHOPRA (R. N.) & BASU (B. C.) Failure of " M_2 " in Prophylaxis of Indian Strains of Malaria.—*Jl Malaria Inst of India* 1939 Sept Vol. 2. No 3 pp 253-255

M_2 is composed of mercuric manganese iodide and concentrated extract of spleen and is manufactured by the Biochemical Institute of Milan. Eight volunteers received treatment with this drug on alternate days over a period of a month. The initial dose was one pill this dose was regularly increased, the final two doses each consisting of 8 pills. Batches of *A. stephensi* infected by *P. falciparum* were fed

on these volunteers either at the beginning of treatment, or just after the completion of treatment, or one month, or two months, after the completion of treatment. In all cases infection took place after normal incubation periods. See also this *Bulletin* 1939 Vol. 36 p. 262.]

N W

FAIGUENBAUM (Jacobo). El tratamiento de Ascoli en el paludismo crónico (Ascoli's Treatment of Chronic Malaria).—*Rev. Chilena de Hig. y Med. Preventiva* 1939 Jan.-Mar. Vol. 2 No. 1-3 pp. 5-16 [20 refs.]

This paper contains a description of Ascoli's method of treatment. The author treated 128 cases of chronic malaria and nine recent infections by this method, an experience which leads him to write enthusiastically of its value.

A W

DIAMANTI (Giovanni). Sulla cura delle splenomegalie malariche. (Treatment of Malarial Splenomegaly).—*Arch. Ital. Sci. Med. Colon e Parasit.* 1939 Sept. Vol. 20 No. 9 pp. 521-529. With 18 figs.

The author describes eight cases treated by Ascoli's method. Two long-standing cases of malarial splenomegaly failed to respond to the treatment. In the six other cases the reduction of the size of the acute malarial spleen was either very marked or complete. The mechanism of adrenalectomy treatment is discussed.

A W

PAULESCU-PODEANU (A.) & CARANOFU (O.). Un cas de paludisme traité et guéri exclusivement par les injections intraveineuses d'adrénaline (Ascoli). (Case of Malaria cured Exclusively by Ascoli's Method).—*Bull. et Mém. Soc. Méd. Hôp. de Bucarest* 1939 July Vol. 21 No. 7 pp. 288-290.

RUSSELL (Paul F.) & ENRIE (Fred W.). Malaria Control by Spray Killing Adult Mosquitoes. First Season's Results.—*Jl. Malaria Inst. of India* 1939 Sept. Vol. 2 No. 3. pp. 229-237. With 2 figs. on 1 plate.

This experiment in malaria control by spraying was carried out in village in Pattukkottai Taluk, Tanjore District, Madras Presidency (see this *Bulletin* 1939 Vol. 38, p. 131). Most of the houses were thatched and had mud walls with partly open sides. The spray used consisted of kerosene 18 parts, pyrethrum 50 (pyrethrum extract) 1 part. Spray-killing adult mosquitoes once a week from June to December prevented transmission of malaria to a marked extent. The spleen and parasite rates in the treated village in November 1939 were 24.0 and 11.5 per cent. as compared with 61 and 52 per cent. in a comparable adjacent untreated village. Some houses were sprayed twice a week and in these the results were still more striking. The total cost of the

measure about one shilling and fivepence per head, was higher than such a village could be expected to defray [See also this *Bulletin* 1937 Vol 34 p 58 and 1938 Vol. 35 p 901] N W

BANERJEE (A. C.) The Gumbi Weir Lucknow—*Jl Malaria Inst of India* 1939 Sept Vol. 2. No 3 pp 257-259 With 1 plate.

The Gumbi Weir at Lucknow was constructed to provide sufficient head of water for the city water supply during the dry season when the shutters of the weir are kept raised except for seven hours once a week. The rapid fall in the water level caused by the weekly lowering of the gates results in a flushing of the drains discharging into the river above the weir mosquito larvae are washed away from them and from backwaters and margins of the river N W

DANILOVA (M I) & BUDUMKO (F A.) [Essai d'utilisation de l'acidol dans la lutte antilarvaire] [Acidol as a Larvicide.]—*Méd. Parasit. & Parasitic Dis* Moscow 1939 Vol. 8 No 2 pp 177-178 [In Russian.] [Summarized in *Rev Applied Entom* Ser B 1940 Jan. Vol. 28. Pt 1 p 8]

In the summer of 1938, laboratory and small-scale field experiments were carried out in and near Rostov-on Don on the control of larvae and pupae of *Anopheles maculipennis* Mg. by means of acidol, which is a mixture of naphthene acids obtained in the process of distillation of petroleum oils. The sample tested came from Batum, and no analysis was made of its chemical composition or physical properties. It proved to be highly toxic to the larvae and pupae and gave complete mortality in 2-24 hours when it was poured on to the surface of the water at a rate equivalent to 32.4 lb per acre and the temperature of the water was 25-31°C [77-87.8°F]. It formed a thin film that did not break up for three days. At water temperatures below 17°C. [62.6°F] it did not spread but formed thick drops and the larvae survived.

PUBLIC WORKS. 1939 Sept. Vol. 70 No 9 p 28.—*New Type Paris Green for Culex and Anopheles Mosquito Control*. [Summary taken from *Public Health Engineering Abstr* Washington 1940 Feb Vol. 20 No 2 p 13 Signed M. S CAMPBELL.]

The relative toxicity of any arsenical depends upon its fineness

Ordinary Paris green has a maximum particle size of about 20 microns and passes about 3 per cent. through filter paper. The new type of Paris green referred to (Anabacher's subsurface floating) has a maximum particle size of two microns and about 15 per cent. will pass through filter paper

The subsurface Paris green is lighter and when dusted on water will float on the surface for several hours, some finally passing through the surface film and floating directly under the film.

It is believed that the new Paris green has the advantage of controlling anopheles better than the regular Paris green, controlling culex as well as anopheles, requiring less for control and extending the period between applications.

- i. SERGUIEV (P. G.) NABOKOV (V. A.) ZEIFERT (J. A.) & KACHALOVA (E. K.) Nouveau pulvérisateur à moteur du système de P. G. Serguiev et V. A. Nabokov Serna 2 (constructeur ingénieur J. A. Zeifert) pour la lutte antilarvaire [New Motor Pulverizer for combating Mosquito Larvae].—*Méd Parasit & Parasitic Dis.* Moscow 1939 Vol. 8, No. 3 [In Russian pp 288-298. With 4 figs.]
- ii. KOWJ (J. S.) & POLKSHKO (G. V.) Résultats des épreuves préliminaires du pulvérisateur à moteur "Serna 2" dans la région de Kharkov en 1938. [Results of Tests with Motor Pulverizer].—*Ibid* [In Russian pp. 299-302.]

i. In the first paper a detailed description is given of a new motor pulverizer ("Serna 2") designed and constructed by the authors for use in the destruction of mosquito larvae. The apparatus—illustrated by three diagrams and two photographs—consists of a vertical two-stroke single cylinder 4.5 h.p. petrol motor which drives the pulverizer proper. This comprises (1) tank to hold the powdered larvicidal mixture (2) mechanism for the conveyance and dosage of the powder actuated at the base of the tank (3) gear box with worm-screw for turning the conveyor (4) ventilator shaft with clutch for connexion to the motor shaft (5) ventilator connected to conveyor by a suction pipe and terminating in an outflow pipe from which the powder is discharged, the degree of scattering being regulated by different kinds of detachable nozzles. The whole apparatus is mounted on a frame and can be carried on a vehicle or on a launch. Detailed instructions are given for working the pulverizer and for estimating the consumption of the larvicide (Paris green). Preliminary tests have shown that by using Serna-2 under different conditions, 100 per cent. mortality of mosquito larvae can be obtained over an area of water up to 50 metres in breadth.

ii. The second paper deals with field tests of the motor pulverizer Serna 2, which proved to be quite satisfactory. The new apparatus showed itself in every way superior to the manual pulverizer. It permits the efficient treatment of larger surfaces of water (thus 16 hectares can be dealt with in 1 hour with the apparatus running 8 kilometres per hour and spreading the larvicide—1 part Paris green to 9 parts kaolin powder—over an area 20 metres wide) and there is considerable economy in man-power (only 2 men are required) and in cost.

C. A. Hoare

- i. RUSSELL (Paul F.) & JACOB (V. P.) Some Experiments with a Cheap Method of treating Casuarina Pits with Paris Green to control Anopheles Breeding.—*Jl Malaria Inst. of India* 1939 Sept. Vol. 2, No. 3 pp. 291-271 With 3 figs. on 2 plates.
- ii. — & — Some Experiments in the Use of Fish to control Anopheles Breeding in Casuarina Pits.—*Ibid* pp. 273-291 With 6 figs. on 3 plates.
- iii. — & — Some Experiments in the Naturalistic Control of Anopheles Breeding in Casuarina-Pits.—*Ibid* pp 293-313. With 5 figs. on 3 plates.

Casuarina-pits are shallow wells the water of which is used for watering young casuarina trees. The part these wells play in affording feeding facilities for anophelines in the Ennore-Nellore

coastal area just north of Madras City has been previously described by the authors [see this *Bulletin* 1940 Vol. 37 p 53]

i. Experiments were made with a cheap and simple method of applying Paris green. About 150 cc. of sand obtained by the side of the pit are mixed with 1.5 cc. of Paris green. The mixture is then distributed over the surface of the water. The labourer employed on the work carries two cartridge belts each holding 25 small stoppered vials each vial contains 1.5 cc. of Paris green. The only other equipment is a tin dipper of 200 cc. capacity. The mixing is done in the dipper with a small stick. The method is obviously limited to sandy places such as is the casuarina growing area in question. When the interval between successive applications was six days or less a good degree of anopheline control was secured. *Culex* breeding was not affected.

ii. This is an account of attempts to control mosquito breeding in casuarina pits by stocking them with larvivorous fish. *Gambusia affinis* was effective much more effective than local species of fish.

iii. Various naturalistic methods of anopheline control in casuarina pits have been tried pollution of water with various vegetable substances and manure agitation of the water shading and changing the flora of the water. These experiments are fully described. None gave very satisfactory results the use of *Gambusia* was much more effective than any of them. N IV

COLLIGNON (E.) La campagne antipaludique de 1938 dans le département d'Alger. [The Anti-malarial Campaign of 1938 in the Department of Algiers].—*Arch Inst Pasteur d'Algérie* 1939 Sept. Vol. 17 No 3 pp 442-456 With 2 graphs & 10 figs on 5 plates.

AMBIALET (R.) La campagne antipaludique de 1938 dans le département de Constantine. [The Anti-malarial Campaign of 1938 in the Department of Constantine].—*Arch Inst Pasteur d'Algérie* 1939 Sept. Vol. 17 No 3 pp 457-466 With 8 figs. on 4 plates.

CAUSEY (O. R.) The Effect of Splenectomy on the Course of Malarial Infection in Canaries.—*Amer J Hyg* 1939 Nov. Vol. 30 No. 3 Sect. C pp 93-99 [10 refs.]

It was found that the course of the malarial infection produced in canaries by the inoculation of *P. cathemerium* infected blood of another canary was uninfluenced by a previous splenectomy. The infection is the same whether the spleen is present or not. On the other hand if a splenectomized canary is inoculated with the blood of an infected duck a normal infection is produced, whereas non-splenectomized canaries similarly inoculated failed to show parasites in the blood. It is thought that the difference is due rather to the removal by the spleen of foreign red blood cells than to any destructive action on the parasites. The author thinks that this factor has to be taken into account when tests for immunity involve the injection of foreign blood corpuscles as for instance when the blood of one monkey species is inoculated into another.

C. M. Wemyss

HEGNER (Robert) & DOBLES (Marian) Attempts to obtain Passive Immunity in Avian Malaria with Blood Serum and Spleen.—*Amer Jl Hyg* 1939 Nov Vol. 30 No. 3 Sect. C. pp. 81-91 With 4 figs.

An attempt was made to confer passive immunity on canaries by the inoculation of serum or spleen emulsion from canaries infected with *P. cathemeromum*. Later the birds were inoculated with the same strain of parasites and from the results obtained it would appear that some slight degree of immunity had been produced. It was evident that the specific protective substances were present in the serum and spleen in low concentrations only
C M IV

HERMAN (Carlton M.) & GOLDFARB (Alvin I.) Temporary Infections with *Plasmodium circumflexum* in Splenectomized Chicks.—*Amer Jl Trop Med* 1939 Nov Vol. 19 No. 6 pp. 595-598

It having been shown by MAXWELL (1933) that a temporary infection of *P. circumflexum* could be produced in chicks by inoculating blood from an infected canary in which the parasite is readily maintained the author decided to test the effect of similar inoculations into splenectomized chicks. In these again only low-grade short lived infections were obtained, the removal of the spleen having had no influence on the degree of infection produced.
C M IV

MAXWELL (Reginald D.) & GOLDSTEIN (Frederick) Strain Immunity in Avian Malaria.—*Amer Jl Hyg* 1939 Nov Vol. 30 No. 3 Sect. C pp. 115-122. [18 refs.]

A careful study of six strains of *P. circumflexum* was made in 263 canaries with a view to testing the strain immunity. Superinfections of any one of four strains which were isolated from wild birds near Syracuse, N.Y. conferred an immunity against the others, though this was more marked against the homologous strain. The two other strains isolated elsewhere gave some mutual protection but were often uninfected by a previous infection with one or other of the four Syracuse strains. It was also found that the small malarial parasite *P. rossi* produced a strong immunity to *P. circumflexum* but the reverse was not the case.
C M IV

WOLFSON (Fruma) Morphological Differences in *Plasmodium relictum* in Canaries and Ducks (*Anas boschas domestica*).—*Amer Jl Hyg* 1939 Nov Vol. 30 No. 3 Sect. C. pp. 123-124 With 7 figs.

A strain of *Plasmodium relictum* was successfully carried on in ducks through thirteen passages. In some of the ducks the presence of parasites could be determined only by inoculating canaries in other cases viable infections were produced. In the canary the gametocytes typically displaced the host cell nucleus and were themselves rounded bodies. In the duck there was a marked tendency for the gametocytes to surround the nucleus, which offered some resistance to displacement. When the strain was inoculated back to canaries only mild infections resulted.
C M IV

MANWELL (Reginald D) & VOTER (Muriel A.) Periodicity in the Asexual Cycle of *Plasmodium nucleophilum* with Additional Notes on this Species.—*Amer Jl Trop Med* 1939 Nov Vol. 19 No 6 pp 531-545 With 3 text figs. & 20 figs. on 1 plate [25 refs.]

A study of periodicity of reproduction of *P. nucleophilum* in 11 canaries has shown that segmentation occurs every 24 hours and has its peak between 10 a.m. and 5 p.m. The proportion of schizonts to other forms is low frequently not exceeding 10 per cent. The number of merozoites varies from 3 to 10 the average being about six. Mature gametocytes may be found at any time during the 24 hours but the peak is a few hours after that of the schizonts. Exoerythrocytic schizonts were not found. A half tone plate shows the parasite in its various stages of development. The characters are slightly different from those given in the original description of this parasite by MANWELL in 1935 though it is the same strain. C M IV

FULTON (J D) Experiments on the Utilization of Sugars by Malarial Parasites (*Plasmodium knowlesi*)—*Ann Trop Med & Parasit* 1939 Dec. 30 Vol 33 Nos 3 & 4 pp 217-227 [16 refs.]

In the original work on the cultivation of malarial parasites Bass and JOHNS (1912) noted that for successful culture glucose or maltose should be present in the medium. In the paper under review the author describes experiments carried out by the respiratory methods elaborated by CHRISTOPHERS and FULTON (1933-1939) to discover the capacity of *P. knowlesi* to utilize various sugars by oxidation. It was found that glucose laevulose maltose mannose and especially glycerol were oxidized as indicated by an increase of the oxygen taken up by the parasites. All these substances have a common chemical grouping in the molecule. It was shown that the blood-sugar level of monkeys with heavy infections was generally much lower than in normal animals while the liver-glycogen store was depleted. During the metabolism of glucose the different phosphorus fractions were estimated and no evidence of phosphorylation of the sugar by the parasites was found [See also this *Bulletin* 1938 Vol. 35 pp 709-711 and 1940 Vol. 37 p 190] C M IV

RODHAIN (J) & LASSMAN (P) Le comportement différent de *Plasmodium cynomolgi* Mayer et de *Plasmodium gonderi* Rodhain et Van den Berghe vis-à-vis des réticulocytes [The Different Behaviour of *P. cynomolgi* and *P. gonderi* as regards the Infection of Reticulocytes].—*C R Soc Biol* 1939 Vol 132 No 23 pp 71-75 With 2 figs.

Three species of monkey malarial parasites have been studied in *Macacus rhesus* from the point of view of their tendency to infect reticulocytes in preference to other red cells. Two of these *Plasmodium knowlesi* which produces an intense infection in the monkey and *P. cynomolgi* which gives rise to a mild infection do not appear to have any predilection for reticulocytes, whereas *P. gonderi* giving rise to a mild infection has, like *P. vivax* of man a marked tendency to infect these cells. It seems clear that this feature is a specific one and in no way related to virulence or pathogenicity. C M IV

VENOMS AND ANTIVENENES.

PRÉCIS OF ABSTRACTS IN THIS SECTION

Snakes—ROSENFELD and GLASS (p. 511) show that the blood of certain snakes is toxic to animals even if the snakes are not poisonous, but that the blood has the power of inhibiting the haemorrhagic action of viper venom under certain conditions.

The experiments of AMUCHASTEGUI (p. 511) indicate that the action of the venom of *Bothrops alternatus* on the circulatory system is primarily on the peripheral vessels and that the cardiac manifestations observed are secondary to the resulting anoxaemia. On the other hand he finds (p. 512) that the venom of *Naja tripudians* has an early and severe action on the myocardium, which is primary and that the peripheral changes are secondary. DE (p. 512) points out that the haemolytic activity of cobra haemolysin is maximum at pH 7.6. Haemolytic activity is increased by heating at 60°C. for one hour by certain lipoids egg albumin lecithin, low concentrations of CaCl_2 and glycine. It is diminished by normal sera of certain animals certain lipoids, casein, cholesterol, high concentrations of CaCl_2 , by PbCl_2 , BaCl_2 , and by HgCl_2 on long standing. He (p. 513) describes the action of iodine and other chemical substances on crude venom and purified haemolysin.

GRASSET and SCHAAFMA (p. 513) give a comprehensive description of the properties of the venom of *Dispholidus typus* which resemble those of the Family Viperidae rather than of the Colubridae, to which the snake belongs on zoological grounds. The principal actions in vivo are coagulant and proteolytic. CHIN (p. 514) shows that injection of *Trimeresurus macrotis* venom increases the lactic acid content of rabbit blood.

WENSE (p. 514) quotes experiments which do not support the theory that the action of certain snake venoms resembles that of saponin.

BLACK (p. 515) discusses the use of cobra venom for the relief of intractable pain. The neurotoxin probably acts on the nerve centres of the brain the onset of analgesia is slow but its duration is long and the margin of safety wide, while there is no tendency to addiction. He quotes his own results. CHOPRA and CHOWHAN (p. 515) point out that cobra venom is contraindicated in cardiac and aortic disease and that administration of vitamin B_1 may be a useful adjunct. In discussing the mode of action of the venom they put forward the view that it contains an esterase which splits a similar substance in the plasma the action of which is to destroy acetylcholine at the nerve endings thus helping to prevent the transmission of impulses.

Spiders—COSTA and SALVERAGLIO (p. 516) describe the gangrenous process resulting from the bite of *Latrodectus mactans*. RAMÍREZ ENRÍQUEZ (p. 516) discusses the treatment of the bite of *L. mactans* by means of injections of calcium chloride the results of which are good. She indicates the pharmacological actions on which the efficacy of the drug may depend. MAXIAKOVITCH (p. 517) describes the preparation of antivenene to the venom of a spider of the genus *Latrodectus*. In the *Public Health Reports* (p. 517) is an account of a heavy infestation of a ship by *Latrodectus mactans* and of the methods of fumigation used to destroy them.

FENLAYSON (p. 518) describes the effects produced by the bite of *Harpactirella lightfooti* for the treatment of which he advocates

L. indistinctus antivenene WATKINS (p 518) records the symptoms including tarantism produced by the bite of *Atrax robustus*. CACCIAPUOTI (p 518) describes a case of fatal poisoning by a spider of the Family Mygalidae.

Scorpions—WATERMAN (p 519) records observations on the feeding habits and parturition of scorpions. BASU (p 519) describes the symptoms due to scorpion sting and the treatment advised and suggests that antiserum should be prepared against local Indian species. SERGENT (p 519) gives further examples of the great therapeutic value of scorpion antivenene in N Africa even in the cases with critical symptoms. SHULOV (p 520) shows that antivenene to the Palestine scorpion *Buthus quinquestratus* may efficiently be prepared by the injection of formalin treated venom.

Ants—WEBER (p 520) describes his personal experience of the sting of the ant *Paraponera clavata* which, unlike one received some time before produced little reaction. C IV

ROSENFELD (Samuel) & GLASS (Sanford) The Inhibiting Effect of Snake Bloods upon the Hemorrhagic Action of Viper Venoms on Mice—*Amer Jl Med Sci* 1940 Apr Vol. 199 No 4 pp 482-486

The authors have confirmed the work of previous investigators who have shown that snake blood is toxic to and may cause death in warm blooded animals but they have also observed that snake blood inhibits the haemorrhage-producing action of the pit viper venoms without however preventing death. The venoms used were those of *Crotalus adamanteus*, *Ancistrodon piscivorus* and *Bothrops atrox*; the snake bloods were those of *C. adamanteus* and the non venomous king snake *Lampropeltis getulus getulus*. The blood of the king snake was more toxic than that of *C. adamanteus* but neither produced haemorrhages.

Varying amounts of blood and venom were mixed and injected into mice and whereas in mice injected with venom alone there were widespread haemorrhages, in mice injected with blood and venom there was either no haemorrhage or if present it was reduced. The blood is most protective after keeping for about 2 days fresher and older blood being less effective. Fresh plasma or serum dried at once retain the property until dissolved. Heating at 56°C. for half an hour does not destroy the property. No anti haemorrhagic principle was found in the sera of warm blooded animals. Protocols of the experiments are given.

The authors do not consider this action to be related to that of antivenene since auto-antibodies are rare the action appears to be non-specific and the property becomes diminished if the blood is allowed to stand for 4 days. (In this connexion it is interesting to refer to the work of CASTELLANI this *Bulletin* 1939 Vol 36 p 567) C IV

AMUCHASTEGUI (Severo R) Action du venin de *Bothrops alternatus* sur le coeur et la dynamique circulatoire [Action of the Venom of *B. alternatus* on the Heart and Circulation.]—*C R Soc Biol* 1940 Vol. 133 No 2 pp. 317-318

Anaesthetized dogs were studied either by electrocardiography or by recording the blood pressure in the left ventricle and aorta.

after opening the thorax and during the maintenance of artificial respiration. The venom was given either as a single fatal dose or as a succession of smaller doses. Heart action was accelerated or remained rapid, blood pressure fell, systole was shortened. Sinus tachycardia, nodal rhythm, ventricular extrasystole and other electrocardiographic changes were seen, pointing to the general effect on the myocardium, but these were always preceded by the hypotension which commenced immediately after the injection. The primary effect is therefore on the peripheral circulation and the cardiac manifestations are secondary to the resulting anoxaemia.

C IV

AMUCHASTEGUI (Severo R.) Action du venin de cobra (*Naja tripudians*) sur le coeur et la dynamique circulatoire. [Action of the Venom of *N. tripudians* on the Heart and Circulation.]—C. R. Soc. Biol. 1940 Vol. 133 No. 2. pp. 318-319

Investigation was by similar techniques to those described above. The changes in blood pressure resembled those due to the venom of *B. alternatus* and the venous pressure was raised. The electrocardiograph showed marked changes in conduction and stimulus initiation. Nodal rhythm, auriculo-ventricular blockage, extrasystole, paroxysmal tachycardia and even ventricular fibrillation were seen. The author concludes that the arterial hypotension and venous hypertension indicate myocardial insufficiency and that the electrocardiographic changes, which are produced at once, indicate severe and early action on the myocardium. The action on the myocardium unlike that of *B. alternatus* is primary. These findings are not in agreement with those of FELDBERG and KELLAWAY [this Bulletin 1938, Vol. 35 p. 436]

C IV

DE (S. S.) Studies on Haemolysin of Cobra Venom. Part II. Effect of Different Substances on the Activity of Cobra (*Naja naja*) Haemolysin.—*Indian J. Med. Res.* 1940, Jan Vol. 27 No. 3 pp. 783-806. With 10 graphs [15 refs.]

1 The haemolytic activity of cobra haemolysin is maximum at pH 7.6

" 2. When cobra venom solution is heated at 60°C. for an hour its haemolytic activity is not diminished but slightly increased. Heating at higher temperature, however, causes loss in haemolytic activity

3 Normal sera of the horse, sheep, rabbit, and guinea-pig, inhibit the haemolysis of the red blood cells of rabbit and guinea-pig by cobra venom, inactivated serum behaves similarly but the inhibition was of lower magnitude than the normal serum. Inactivated horse serum slightly accelerates haemolysis.

" 4 The lipoids extracted from the sera of guinea-pig and rabbit accelerate the haemolysis of red blood cells of guinea-pig but lipoids from sheep serum cause inhibition.

5 Casein causes inhibition of haemolysis of red blood cells of guinea-pig, but egg-albumin slightly accelerates its haemolysis

" 6. Lecithin accelerates the haemolysis of red blood cells of guinea-pig by cobra venom and the effect is more marked at pH 7.8 than at pH 6.0 while cholesterol inhibits haemolysis.

" 7 Higher concentration of CaCl_2 inhibits haemolysis of red blood cells of guinea-pig but lower concentration accelerates haemolysis. PbCl_2 and BaCl_2 inhibit haemolysis. HgCl_2 on long standing in contact with cobra venom inhibits its haemolytic activity. Haemolytic activity of purified haemolysin is increased with the addition of glycine."

DE (S S) Studies on Haemolysin of Cobra Venom Part III Reversible Inactivation of Haemolysin of Cobra (*Naja naja*) Venom.—*Indian J Med Res* 1940 Jan. Vol. 27 No 3 pp 807-817 With 6 graphs. [15 refs]

1 The haemolytic activity of crude cobra venom solution is first increased but finally depressed on standing in contact with a moderate concentration of iodine solution but with lower concentration the activity increases and no reversal of activity is obtained. The partly inactivated product regains its activity on treatment with H_2S NaCN ascorbic acid, cysteine and reduced glutathione. With purified haemolysin these resulted always in inactivation of the product and its activity was regained with the reagents tried with crude venom.

2. Behaviour of hydrogen peroxide and ferricyanide is similar to that of iodine but the effect of ferricyanide is less pronounced than that of iodine

3 Effect of benzoquinone is rather peculiar it has no action on crude venom, but depresses the activity of purified haemolysin in 10 minutes which is partially regenerated by hydrogen sulphide.

4 Cuprous oxide and phenyl mercuric chloride inactivates purified haemolysin which can be restored by treatment with hydrogen sulphide and reduced glutathione

GRASSET (E) & SCHAAFSMA (A) Recherches sur les venins des colubridés opisthoglyphes africains. 1 *Dispholidus typus* 1re Partie. Envenimation expérimentale. Propriétés toxiques et antigéniques 2e Partie. Neutralisation. Détoxication. Immunisation active et obtention d'un sérum spécifique au moyen de l'anavenin formolé [The African Colubridae Opisthoglyphs. 1. *Dispholidus typus* Part 1 Toxic and Antigenic Properties of the Venom, Part 2. Neutralization, Detoxication, Preparation of Antivenene.]—*Bull Soc Path Exot* 1940 Jan 10 & Feb 14 Vol. 33. Nos 1 & 2. pp 50-64 114-131 [22 refs.]

The descriptions of the African Opisthoglyphs hitherto published have been concerned chiefly with zoological and anatomical characters and the authors have therefore now made extensive research into the action of the venom of 36 specimens of *Dispholidus typus* (the boom slang) all captured in S Africa. In the first part of this paper are given the general characters of the snakes and of the venom. The action of the venom is much more rapid than that of the Proteroglyphs, and when injected intravenously into pigeons produces dyspnoea, incoordination of movement and rapid death from asphyxia. On intramuscular or subcutaneous injection similar symptoms arise more slowly together with local haemorrhage and necrosis. At autopsy the blood is usually fluid and if collected remains uncoagulated indefinitely but there are no haemorrhages in the organs or musculature and haemolysis is not seen.

The m.l.d. for the pigeon is from 0.0001 to 0.001 mgm by intravenous injection and the lethal action is swift. The toxicity is considerably greater than that of the Proteroglyphs, either African or Asiatic and is distinguished from them by having no neurotoxic effect such as paralysis of the respiratory centre. The venom causes rapid coagulation of human and animal blood *in vitro* in minute doses. This property resembles that of the Australian Proteroglyphs (*Pseudechis Notechis*) and is not possessed by the African and Asiatic (*Naja*)

species. Serum prepared against these Australian snakes does not however protect against *Dispholidus typus*. Haemolysis is not a feature of the action of the venom. There is a definite proteolytic action on gelatin and this is paralleled by the proteolytic action observed *in vivo* the rapid action of the venom appears to depend on the two toxic fractions, coagulant and proteolytic. The blood of the snake is apparently non-toxic.

The second part of the paper is concerned with antivenene production. It is first shown that the majority of sera prepared against *Naja flavo Bitis arietans Naja tripudians Vipera russelli Dromasoma superba Notechis scutatus Vipera aspis* and species of *Crotalus* and *Bothrops*, have only a feeble group action in protection against *Dispholidus typus* the most efficient is a polyvalent serum against the first two the next a serum against *Bothrops*. This fact is further evidence that although zoologically *Dispholidus typus* is a member of the Family Colubridae, the properties of its venom are more nearly related to those of the Viperidae, especially *Bitis* and *Bothrops*.

Detoxication of the venom though not complete, may be obtained to a considerable degree by the addition of 1.5 per cent. of formal for 17 days at 37°C. If physiological saline is used as diluent the antigenic properties of the venom are retained and are capable of producing a high degree of immunity in animals, and a primary injection of 3 000 m.l.d. may be tolerated. Under the action of specific antiserum the coagulant property of the venom is eliminated, and the venom is neutralized both *in vitro* and *in vivo*. Specific serotherapy should therefore be adopted. [See also this Bulletin 1939 Vol. 36 p 863.]

C IV

CHIN (Kensho) Ueber den Einfluss des Giftes von *Trimeresurus macroscymus* (Cantor) auf den Milchsäuregehalt im Blut des Kaninchens. [The Action of the Venom of *T. macroscymus* on the Blood Lactic Acid of Rabbits.]—*Tsishon Igakku Zasshi* (Jl Med Assoc Formosa) 1940 Feb. Vol. 39 No. 2. [In Japanese pp 145-162 With 4 charts. [30 refs.] German summary pp. 162-163.]

The author shows that in acute poisoning of the rabbit by the venom of *T. macroscymus* there is a definite increase in the lactic acid content of the blood roughly proportionate in intensity and duration to the amount of venom injected. The effect of this is reduced if the splanchnic nerves are cut but section of the vagus has no effect. In chronic intoxication with this venom the high lactic acid content observed in the early stages is gradually reduced and this appears to suggest that blood lactic acid may produce tolerance to the venom.

C IV

WIKKE (Theodor) Ueber die chemische Natur des Schlangengiftes. Ein Vergleich mit Saponin. [The Chemical Nature of Snake Venom a Comparison with Saponin.]—*Biochem Ztschr* 1939 Oct. 20. Vol. 302. No. 5-6. pp. 426-429 With 1 fig [10 refs.]

It has been stated by FAUST that the venom of certain snakes possesses an action similar to that of the saponins, though the work of BAYER and ELBEL does not support this view [this Bulletin 1934 Vol. 31 p 102] MEURLING has shown that the venoms of *Naja tripudians*

and *N. nigricollis* in dilutions of 1 in 5 000 to 1 in 100 000 cause diminution of the action of adrenalin on the perfused frog's heart. The effect of pilocarpine is diminished by venom stronger than 1 in 100 000 but is increased by weaker solutions. Using a similar technique, but with saponin in place of venom the author found that this substance increased the effect of adrenalin but caused no change in that of pilocarpine. The venom of *Pipera berus* was found to have an action similar to but weaker than that of the cobras. The difference between the action of saponin and that of the venoms therefore makes it unlikely that saponin is an essential component of snake venom. C IV

BLACK (Wm T) Jr. Cobra Venom for the Relief of Pain.—*Southern Med J* 1940 Apr Vol 33 No 4 pp 432-437 With 1 graph [23 refs.]

The author treated 17 patients with intractable pain principally from carcinoma of the cervix with cobra venom. The usual dose given was 5 mouse units which may be given every other day when once relief is established. Smaller doses are used at the beginning. Variations in individual requirements are of course, found, and with progressive improvement the dose may be diminished. There is no tendency to addiction and some patients report increase in appetite and improvement in the general condition. No patient developed any inflammatory reaction at the site of the injections. Four patients developed nausea and vomiting but it is thought that these were psychic phenomena due to knowledge of the nature of the injections and the author does not now disclose this to the patients. There were 8 results described as good 6 as fair and 3 as poor. The average number of injections was 21.

The author inclines to the view that the action is not on the motor or sensory nerve endings but that the neurotoxin acts upon the nerve centres of the brain probably those of the thalamus. The onset of the analgesia is slow but its duration is long and the margin of safety is wide. C II

CHOPRA (R. N) & CHOWHAN (J S). The Venom of Indian Cobra (*Naja naja*) in Certain Painful Conditions.—*Indian Med Ga.* 1940 Feb Vol 75 No 2. pp 69-75 [22 refs.]

The authors discuss the chemical composition of snake venoms and show that the neurotoxic fraction which preponderates in the Indian cobra is responsible for the various clinical uses for which cobra venom has been advocated. It has been thought that the analgesia produced is of central origin but another view is now put forward. It is known that on stimulation of motor nerves acetylcholine is produced at their endings and carries the impulse to the end organs. The acetylcholine is rapidly destroyed by a specific choline esterase in the plasma and appreciable amounts of esterase have been found in cobra venom. Injection of the venom will therefore increase the plasma esterase content and help to prevent the transmission of impulses from the nerves to the tissues and *vice versa*. It will in this way cut off the extraordinary and exaggerated sensation or impulses passing between the nerve and the tissue. [This appears to be a *non sequitur*. Is there any evidence that acetylcholine is concerned in the transmission of impulses from the tissues along the sensory

nerves? To the reviewer the action of venom would only be explicable on this theory if the muscles, through continuous production of acetylcholine were in a state of continuous and painful contraction.]

The venom used therapeutically was a solution (1 in 10,000) of the venom of *Naja naja* with 0.25 per cent. carbolic acid, and this contained 10 mouse units per cc. It was fully tested for bacterial sterility. Contraindications are cardiac and aortic disease and the treatment is regarded as incompatible with administration of iodine, gold and silver salts and radioactive substances. Sensitiveness was seen in only a few patients, and in some patients resistant to the venom treatment good results may follow administration of vitamin B₁.

The patients treated were suffering from a diversity of conditions principally neuritis, sciatica and arthritis, and of 65 treated 23 experienced marked relief, and a further 23 definite relief, 9 slight relief and 10 no relief. Injections were given intramuscularly twice or thrice weekly in doses ranging from 1 to 20 mouse units. Purified neurotoxin has now been prepared to see if it is more effective than whole cobra venom.

C IV

COSTA (R. S.) & SALVERAGLIO (F. J.) Nota previa sobre arañismo cutáneo en el Uruguay [Cutaneous Manifestations of Spider Bites in Uruguay Preliminary Note.]—*Arch. Uruguayos de Med. Ciruj. y Especialidades* 1939 May Vol. 14 No. 5 pp. 417-430 With 5 figs [24 refs.]

The pathological effects of the bites of spiders, especially *Latrodectus mactans* have been classified in various ways by different authors, but HOUSSEY in 1916 recognized two principal effects, nervous and gangrenous. The gangrenous process begins with erythema and oedema going on to a violet colour with blister formation and, in 48 hours, to necrosis and later the formation of a dry black eschar. There is intense pain lasting for several days. Bacteriological examination of the blister fluid is at first negative.

Details of 8 patients are given and five photographs illustrate the local necrotic lesions. It is pointed out that the species of spider responsible is not often determined and in some instances no spider was seen by the patient. The authors are however convinced that spiders were responsible for the lesions described.

C IV

RAMÍREZ ENRÍQUEZ (Flora) La picadura del *Latrodectus mactans* ('Araña capulina o viuda negra') [The Bite of *L. mactans*]—*Medicina* Mexico. 1939 June 10 Vol. 19 No. 341 pp. 183-189

The author describes the effect of the bite of *L. mactans* in man emphasizing especially the tenderness of the *vientre de madera* or wooden abdomen [see also this *Bulletin* 1938 Vol. 33 p. 401], and the tetanic symptoms. Oedema of the eyelids and legs occurs, probably as a result of toxic nephritis. After mentioning briefly the treatments usually employed, together with those used by natives, the author goes on to describe the results of treatment with calcium chloride and magnesium chloride in pigeons and man. She shows that the pharmacological action of the venom consists of stimulation of the nervous system with contraction of the abdominal muscles, retardation of the heart beat and of coagulation of the blood and, later oedema. The

action of calcium chloride on the other hand is in the direction of paralysis of the nervous system acceleration of the heart beat and of coagulation and it is used as a diuretic and anti-spasmodic. The venom diminishes peristalsis causes renal congestion and rigidity of muscles magnesium chloride augments peristalsis causes diuresis and tends to relax rigidity of muscles. In pigeons the drugs caused rapid disappearance of symptoms and the author considers that this result may be due either to antagonistic physiological action or to the formation of innocuous insoluble compounds between the venom and the drugs.

Three of many human cases are cited in which intravenous injection of the drugs mentioned brought about rapid relief the results being described as magnificent. Unfortunately the exact dosage is nowhere stated, but it is remarked that the drugs were used in convenient proportions. [See also this *Bulletin* 1939 Vol. 38 pp 570 571]

C IV

MAXIANOVITCH (M I) Le venin du kara kourto *Lathrodectus* 13-guttatus agissant comme antigène efficacité de l'antitoxine dans les expériences sur les animaux. [The Venom of the Kara-Kourto, *Lathrodectus* 13-guttatus as Antigen Efficiency of the Antivenene.]—*Med Parasit & Parasitic Dis* Moscow 1939 Vol. 8 No 6 [In Russian pp. 51-63 With 3 figs French summary p. 64]

An extract of 10 to 20 venom glands in 1 cc. saline was prepared and formalin was added to a strength of 0.5 to 1 per cent. Detoxication was complete in 7 days at 37°C. and this antivenene was used for the immunization of horses. It was injected until the animals were refractory to about 8 fresh glands, after which fresh glands and finally the bites of as many as 40 spiders simultaneously were used to increase the immunity. The horse serum was then capable of protecting a guinea pig against an actual bite and was effective in treatment after the bite of 2 or 3 of the spiders.

C IV

PUBLIC HEALTH REPORTS. 1939 Dec. 15 Vol. 54 No 50 pp 2195-2196.—Unusual Infestation of a Ship with Black Widow Spiders.

At the Miami Quarantine Station the captain of a ship reported heavy infestation with spiders which on examination proved to be *Lathrodectus mactans*. The infestation was widespread and adults and egg sacs were found even in the crew's quarters, though no bites were reported. Fumigation with HCN gas was employed and afterwards 174 adults were found dead. In 5 egg sacs dissected the number of eggs and dead spiderlings numbered from 137 to 273. A second fumigation was performed 3 weeks later but even after this several living spiders were found among petrol drums on deck. A third fumigation may be necessary.

So heavy an infestation does not appear to have been reported before an ample food supply of cockroaches and extensive safe harbourages in the complex structure of the ship probably accounted for a rapid rate of reproduction.

C IV

FINDLAYSON (M. H.) *Harpactirella lightfooti* as a Cause of Spider Bite in the Union. With a Note on the Biology of *Harpactirella lightfooti* (Purcell) by R. SMITHERS.—*South African Med J.* 1939 Dec. 23. Vol. 13. No. 24 pp 808-810 With 1 fig

During an investigation on knoopie (or knoppie) spider bite in South Africa [this *Bulletin* 1938 Vol. 33, p. 402] various instances of so-called "tarantula" bite were reported. Specimens of the spiders were obtained and were found to belong to the genus *Harpactira*. Later two human cases were reported in which *Harpactirella lightfooti* was considered to be the causal agent. Symptoms consisted of an immediate local burning sensation, a latent period of 2 hours, followed by signs of shock with vomiting and collapse. There was no local reaction. After treatment with morphia and adrenalin recovery was complete in 24 hours.

White mice were killed by the bite of *H. lightfooti* with symptoms of nervous irritation and convulsions, but a guinea pig survived after showing similar symptoms. The extracted venom is extremely labile and is destroyed by the process of extraction employed grinding the sacs with distilled water drying at 0°C. over P_2O_5 and redissolving in water. Intravenous injection of *Latrodectus indistinctus* antivenene given to white mice before the bite of *H. lightfooti* appears to give some protection and the use of this serum is advocated in man.

The bite of this spider is evidently not so severe as that of the various species of *Latrodectus* known as "knoopie-spider"

A description of the spider is given by Smithers.

C IV

WATKINS (A. M.) A Bite by *Abrax robustus*. [Correspondence].—*Med J Australia* 1939 May 6 26th Year Vol 1 No 18. p 710.

The (adult male) patient was bitten in the ring finger by the trapdoor spider *Abrax robustus* whose bite is sometimes fatal. The symptoms were mask-like face, staring eyes, dilated pupils, risus sardonicus profuse salivation and tarantism, the execution of short dancing steps. There was no pain. Local treatment with a paste of ammonia and bicarbonate of soda, warmth and copious drinks of hot fresh tea were given and recovery was complete in two days though he at first felt stiff and sore all over.

The author has never before seen tarantism in spider bite.

C IV

CACCIAPUOTI (Raffaele) Avvelenamento letale da puntura di *Mygalidae* [Fatal Poisoning by a Spider of the Family Mygalidae].—*Rass. Sanitaria dell' A.O.I.* Addis Ababa. 1939 Sept. 9 Vol. 1 No. 3 pp. 37-42. With 2 figs.

Specimens of the spider concerned were captured in the Uollo region of Italian East Africa, and the author considers them to belong to the Sub-order Tetragnemora, Family Mygalidae and probably to the Genus *Theraphosa*. The spiders are reddish brown and are 8 to 9 cm. in length. A child of 7 was bitten on the left heel and was brought to the author in a condition of shock, with stupor and myosis. There

was profuse sweating and sialorrhoea choreic movements, rapid breathing and intense thirst Ecchymoses were seen at the place of the bite with oedema of the leg and lymphangitis The heart was dilated vomiting and the passage of two blood-stained liquid motions had occurred The child died in coma about eight hours after the bite.

C IV

WATERMAN (James A) Some Observations on the Habits and Life of the Common Scorpion of Trinidad.—*Trans Roy Soc Trop Med & Hyg* 1939 June 29 Vol 33 No 1 pp 113-118.

This is a brief but interesting account of the habits of *Tityus trinitatis* the common scorpion of Trinidad The feeding habits are described and it is shown that the sting is only used if the prey struggles so vigorously as to hinder the process of eating The poison is fatal to all small insects and to other scorpions of the same species, but an insect killed by sting can be ingested with impunity Parturition was witnessed in one case and demonstrated that scorpions are viviparous, the young being born enveloped in a membrane which is removed by the mother The young are thereafter encased in a transparent silky coat which is shed with some difficulty after a week during which they are huddled together on the mother's back

C IV

BASU (U P) Observations on Scorpion-Sting and Snake-Bite.—*Amer J Trop Med* 1939 July Vol. 19 No 4 pp 335-391 With 3 charts & 4 figs.

The author reports 19 cases of scorpion sting admitted to the Calcutta Medical College Hospitals between 1928 and 1937 Of these 13 were children between the ages of 2 and 10 and five of these died During the same period there were 27 cases of snake bite with 17 deaths The symptoms in the scorpion cases consisted of intense pains immediately and some hours after the sting, with headache giddiness nausea vomiting and profuse perspiration with chill which are described as allergic symptoms In some instances these were followed by unconsciousness cold extremities subnormal temperature muffled heart sounds and feeble pulse In the fatal cases oedema of the lungs was the usual cause of death

Treatment consisted of the local application of liq ammon. fort and novocaine-adrenalin injections with treatment for shock and atropine for the pulmonary oedema combined with intravenous glucose and intramuscular calcium For viperine snake bite calcium and adrenalin were used in addition to serum The author advises that anti-scorpion serum should be prepared from local species.

C IV

SERGEANT (Etienne) Sérothérapie antiscorpionique. Deuxième note Nouvelles observations (1938) [Anti-Scorpionic Serotherapy]—*Arch Inst Pasteur d'Algérie* 1939 Sept. Vol 17 No 3 pp 412-420

Since the publication of the first therapeutic trials of scorpion antivenene [this *Bulletin* 1939 Vol. 36 p 884] 17 medical men in N

supervise about 90 000 people who are visited twice each year. About 400 people may be examined in one day and it is evident that the examination can only be cursory. It is enough, however, for an expert to detect the principal diseases. The healthy are dismissed briefly, the suspects are given more attention, and the suspects as a rule form one-quarter of the population.

The remaining part of this very full exposition of the aims and achievements of Fortain is concerned with descriptions of the methods adopted and with a statement of the numbers dealt with in connexion with the various diseases, with the results of the campaign for better hygiene and with a statement of the population figures of the districts surveyed. Much of this information has been abstracted already in this *Bulletin* [1934 Vol. 31 p. 328 1935 Vol. 32 p. 501 1939 Vol. 36 p. 408]. To those who are interested in the problem of how best European medical control can be applied to native races the series of four papers under review provides food for serious thought. The account is clear and precise.

C II

CONGO BELGE. FONDS REINE ELISABETH POUR L'ASSISTANCE MÉDICALE AUX INDIGÈNES DU CONGO BELGE. RAPPORT ANNUEL 1938 [DE BRAUWERE, Médecin-Directeur] [The Fortain Service in the Belgian Congo. Report for 1938.]—108 pp. With 1 map. Bruxelles. 112 rue du Commerce.

Largely for financial reasons the year 1938 was marked by some reduction in the activities of Fortain and a return to its normal programme after four years of extension to deal with the urgent conditions necessitating its activities in the inhospitable region of Kwango. Nevertheless, the amount of work done was impressive. Pulmonary tuberculosis is more in evidence than formerly and is contracted in the villages by those who have never left them to seek work in industry. Sleeping sickness (the report of which has been abstracted in this *Bulletin* 1940 Vol. 37 p. 368) shows considerable regression and is now only serious in localized areas. Child welfare schemes are greatly extended and may be expected to have considerable influence upon infant mortality as is the case with the successful efforts made by the authorities to improve the nutrition of the natives. The system of rural dispensaries has been extended and there are now 220 of these in addition to 29 larger dispensaries. The native personnel numbers 538.

The total number of natives examined was 868,333. New cases of trypanosomiasis were 2,548 and in all 8,393 were treated, with 9,833 cures. New cases of yaws numbered 1,604 and 2,072 cases of leprosy. 7 037 of ulcer and 78,300 of helminthic infestations were treated. The general morbidity index was 57.7 per cent. as against 41.52 per cent. in 1937.

In 1938 31,851 deaths were registered, a considerable increase over the 25 754 of 1937 but the reason is probably that the registration methods have improved though it is thought that there may have been an increased mortality owing to malnutrition in certain diseases normally mild. There were no widespread epidemics. It is noteworthy that infant mortality figures have not increased in the same proportion.

The epidemic of spastic paraplegia [*komo* see this *Bulletin* 1939 Vol. 36 p. 501] which occurred in 1937 caused, in 200 patients,

death in 16.5 per cent. and permanent sequelae of varying severity in 70.5 per cent. Only 13 per cent. were cured but two recent severe cases have shown such good progress with treatment by Betaxin and two others with Astreptine that these treatments are now being extended.

Malaria is endemic but the only feasible method of control is by systematic drug treatment and drug prophylaxis.

Further work on the syndrome known locally as Buaka, Kibengi or Katoto [see this *Bulletin*, 1939 Vol. 36 p. 912] has shown that rapid and complete cure can be obtained by giving animal protein in the diet without having recourse to specialized vitamin products. The requirements in animal protein cannot be satisfied except by the encouragement of the rearing of small domestic stock. This however is possible but the principal difficulty is to overcome the native habit of mind which regards stock as currency to be preserved.

In a letter from the Provincial Commissioner of Leopoldville quoted at the end of this report it is pointed out that in the work of Foréami the civilizing and educative forces are even more important than the purely medical work. C IV

HUMPHRIES (S. V.) The Control of Native Diseases in the Belgian Congo—*South African Med J* 1939 Sept. 9 Vol. 19 No. 17 pp. 635-640 With 4 figs. [11 refs.]

The most important endemic diseases of the natives of Central Africa are malaria, trypanosomiasis, helminth infections, leprosy, bilharzia, venereal diseases and yaws. The most important epidemic diseases are probably smallpox and measles.

The author notes the credit due to the Belgian Government for the admirable way in which native sickness has been tackled, with the assistance of the Foréami organization and numerous missions and private societies. The number of trypanosome infections, of all kinds, early and late, which in 1927 was 5.13 per cent. has fallen to 1.3 per cent. in the epidemic areas, and is approximately 0.6 per cent. of the whole population of the colony. It is noted that the complete medical census of the natives always proves indispensable in seriously affected areas for the tracing by frequent re-examination of new cases. The number of centres for treating trypanosomiasis exceeds 1,400.

Syphilis is rapidly decreasing in the towns where proper treatment is available for all, and in country districts travelling clinics help in this work. Treatment is compulsory and as a last resort, which however is rarely needed, imprisonment may be employed against defaulters.

A description is given of the principles underlying the training of native medical personnel from native medical assistants who take a six-year course, to *gardes sanitaires* and *aides-acouchouses* with four and two-year courses respectively. All work done by natives is carefully supervised but the degree of responsibility allowed naturally varies.

The Foréami organization has been described before in this *Bulletin* [1935 Vol. 32 p. 501, 1936 Vol. 33 p. 646, 1937 Vol. 34 p. 820, 1939 Vol. 36 p. 408]. It aims at a complete and progressive cleansing of the country. After five years in the Bas-Congo it now extends to the Kwango district.

During 1937 for a population of 11 millions there were 164 Government medical officers and 106 medical officers to societies and missions.

The author gives credit to the Belgians for their wisdom in recognizing the importance of intensive action to improve the health of the natives, and in comparison speaks of the short-sightedness of South Africa's native policy. He advocates for the Union in addition to measures similar to those outlined above, the compulsory possession by natives of certificates of health for the more effective control of disease. [An excellent account of an impressive medical service.] C IV

DIAMANTI (Giovanni) La nosografia della regione del Medio Giuba (residenza di Bardera) [Diseases of the Middle Juba Region].—*Arch Ital Sci Med Colon e Parasit.* 1939 Aug Vol 20 No 8 pp 449-503 With 29 figs. & 1 map

The inhabitants of this region number about 40 000 of several different tribes which are divided broadly into the pastoral nomadic Somalis and the agricultural negro type. The former obtain their principal foods, milk and meat from their animals. The chief diseases are malaria, syphilis and tropical ulcer. Subtertian malaria is more frequently found than the others, and is hyperendemic in some parts being transmitted by *A. gambiae* and *A. funestus*. Syphilis is usually a benign affection, involving almost exclusively the skin and mucous membranes even in the tertiary stage. The author considers that the mildness of the syphilis may be due to the universal malaria contracted at an early age. No neurosyphilis is seen but there is a condition of Somali ostealgia with pain in the long bones which he attributes to secondary syphilis. Gonorrhoea and soft sore are very common.

Tropical phagedaenic ulcer is found chiefly in the poorer classes and especially in women working in the fields. In recent years about one third of the patient-days in the local hospital have been on account of tropical ulcer. Tuberculosis of the lungs and other parts is not uncommon, and yaws, schistosomiasis, amoebiasis, mycetozoa and elephantiasis are noted as diseases found.

The author discusses possible means by which the heavy disease incidence may be reduced and concludes that the basis of all measures must be the education of the natives. C IV

CARDMICHAEL (J) Bovine Tuberculosis in the Tropics, with Special Reference to Uganda. Part I.—*Jl Comp Path. & Therap* 1939 Dec. Vol. 52 Pt. 4 pp 322-335 With 2 figs. [34 refs.] [Summary appears also in *Bulletin of Hygiene*]

The author begins with a comprehensive résumé of the reports from India, Tropical Africa and Egypt of tuberculosis in cattle. In general the reported incidence has been small but in recent years the recorded cases have increased, though this does not necessarily mean that the incidence has actually risen. In Uganda no cases were found between 1919 and 1928, but thereafter the figures increased until in 1938 77 of 231 carcasses of Ankole cattle (33.3 per cent) and 49 of 7,848 zebu cattle (0.6 per cent) were found to be diseased. In the Ankole cattle one-half of those diseased show lesions in the thoracic cavity.

The Ankole cattle with enormous horns and no hump are of a different species from the humped short-horned zebu cattle and are only found in parts of Uganda, Tanganyika and the Belgian Congo. Their origin is not known but it is thought that they came first from

Abyssinia. So far as is known no European cattle have ever passed the boundary of the Bahima owners of these animals.

The Ankole cattle are only rarely housed in the daytime they roam the short-grass down like country and at night are driven into thorn bush enclosures in which fires of dried cow dung are lighted to ward off biting insects. The cattle crowd round these fires head to head and it is thought that this close contact and the coughing due to the smoke may facilitate the spread of tuberculous infection. The heavy infection of this one isolated breed of Ankole cattle is an interesting feature the question of the relative susceptibility of the Ankole and zebu cattle will be discussed in a later paper.

The author has no doubt that the disease is spreading and the main portal of entry appears to be the respiratory tract. Generalized lesions are not common but do occur and the limitation of the disease to glands shows that there is considerable resistance. Of 39 strains of *Mycobacterium tuberculosis* isolated from cattle all were proved to be of the typical dysgonic bovine type, with normal virulence.

Figures of a series of tuberculin tests are given in which the zebu groups show very much less infection than the Ankole or the mixed breeds. [See also *Bull. of Hyg.* 1939 Vol 14 p. 215] C IV

CARMICHAEL (J.) Pulmonary Tuberculosis in Uganda Natives. A Bacteriological Survey—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940 Jan. 29 Vol 33 No 4 pp 453-459 [23 refs.] [Summary appears also in *Bulletin of Hygiene*]

This is a continuation of part of the work abstracted in this *Bulletin* 1939 Vol. 38 p. 346. The literature on pulmonary tuberculosis in man caused by the bovine type of bacillus is reviewed and the author's investigations in the Uganda cattle (see above) are summarized. The human sputa from which cultures were obtained were received in various stages of decomposition and the author finds that "the tubercle bacillus appears to be able to withstand decomposition under conditions pertaining in Uganda up to at least 7 days. The average temperature during transit would be approximately 75° to 85°F."

Carmichael has now typed 283 cultures from human sputum and has found four to be of the bovine type in each case these bovine bacilli were recovered from patients who belong to tribes which own Ankole or mixed Ankole zebu cattle. In view of the fact that the Ankole cattle are heavily diseased that their disease is largely confined to the thoracic cavity (see above) and that sick animals share the hut of the owner conditions are apparently ideal for a bovine-human-bovine cycle but for some reason this does not take place and one is forced to consider whether the human lung is in some way resistant to the bovine tubercle bacillus having regard to the fact that the inhalation of bovine organisms in many cases of cattle contact seems inevitable.

A few tuberculin tests on Uganda natives are recorded but the figures while appearing to suggest higher rates in the owners of Ankole cattle than in the others, are too small for generalized conclusions to be drawn. It is worth noticing that many of the sputum-positive patients were found in itinerant labourers originating from Ruanda Urundi in the Belgian Congo where both surgical and pulmonary tuberculosis are known to be common although there is little evidence of disease in the cattle. [Tuberculosis in imported labourers in East Africa is often seen and may possibly be due to the breaking down under the stress of

work, of recent "larval" lesions. There is reason to believe that in S. Africa labourers who on recruitment are strongly positive to the tuberculin test break down more frequently than those moderately positive or negative. It may be, as the reviewer has suggested before that the tuberculin testing of all labour recruits and the exclusion from labour of all strongly positive reactors might reduce the subsequent incidence of tuberculous disease in these men.] C IV

MACDONALD (George) Discussion on Rural Hygiene in the Tropics
Conservancy in Rural Areas.—*Jl. Roy San. Inst.* 1939. Dec.
Vol 60 No 6. pp 261-263 [Summary appears also in *Bulletin of Hygiene*]

In the tropics two distinct types of population are the subject of sanitary effort—the village population and the population of estates and mines. The possible conservancy systems are four—the pit the bored-hole the bucket type and the water flushed system. The pit latrine has not fulfilled expectations, many communities object to it on the ground that it bears evidence of previous use, a fact which, especially among orthodox Hindus, raises caste issues. The bored-hole latrine of 16-inch diameter is intended to reach to 5 or 6 feet below the subsoil water level, thus reproducing septic tank action. It may however be used at a depth of 20 feet if it is not practicable to reach the subsoil water level, but in this case septic tank action is not possible and the latrine should be closed if evidence of filling appears. [For details of construction see *Bulletin of Hygiene* 1938 Vol. 13, p 591]

It has been found that a maximum distance of travel of *Bact. coli* inoculated into bored-hole latrines in permeable quartzite soil was 70 feet, which gives little risk to wells at 100 feet, and this is regarded as the safe distance except in fissured soils. [But in discussion MARBUR states that in the Punjab observations indicate that contamination has been found to travel a distance of 200 feet.]

The bucket system is so full of disadvantages that it is not recommended if an alternative is possible.

Water-flushed systems are suitable for estate use where continual supervision is possible. The necessary requirements are—sufficient purification to allow safe discharge of effluent into an earth drain, low costs frequent automatic flushing, a building and floor which can easily be cleaned, ready access from houses and an ample supply of water for ablution purposes (essential for most races in the tropics). The author describes automatically flushed communal latrines of the trough type which is well adapted to the squatting posture.

The final recommendation for villages and small estates is the bored hole latrine and for larger villages and estates a water-carriage system.

[The remark on the necessity for ablution water for tropical races is timely—it is used for the cleansing of the anus. But is there enough emphasis laid, in our conservancy schemes, on the necessity for the cleansing of hands after defaecation?] C IV

GILLANDERS (George) Discussion on Rural Hygiene in the Tropics
Rural Housing.—*Jl. Roy San. Inst.* 1939 Dec. Vol. 60 No 6.
pp. 230-240 With 14 figs.

The author calls attention to the importance of tribal customs and beliefs in connexion with housing and general sanitary measures.

For instance in some tribes it is not the custom for a man to share a room with his wife some natives believe that spells may be cast over their excreta, and that emanations from latrines may spread infection. These beliefs must be taken into account in any schemes introduced for native welfare and may even be turned to useful purpose as in the demonstration that deep latrines confound the witch doctors. In a community in which the average monthly income is only a few shillings it is evident that the building materials advised must be cheap, easily obtained and effective.

In Uganda there is now evidence that the efforts made including propaganda health exhibitions and instruction in building are bearing fruit and that windows for instance are now appearing in native huts.

Experiments have been made with bitumen-covered hessian supported on wooden frames as a roofing material less expensive than corrugated iron and unsuitable for rodents. Details are given and although in the early processes it was found that after a time the dressing became detached the later preparation of bitumen emulsified in volatile oils applied to the finer texture hessian shows signs of greater success and the whole process is no more expensive than stepped thatching.

For walls *pisé-de-terre* is advocated and it is noted that a booklet on the subject is available from the Uganda medical department. The necessary materials, other than the moulds are available in even the remotest village and the house can if necessary be built by the owner himself. Bitumen may be used in place of concrete to cover the floors and provides a damp-proof and probably an ant proof course for the walls. Ventilation for those who fear that windows may offer attractive opportunities for spear throwing enemies, may be provided by a six-inch space at the wall head.

Finally the author again stresses the importance of the due consideration of the vital factors of economics and native psychology. In discussion MacLEOD objects that *pisé-de-terre* is a difficult and complicated method of building beyond the capacity of the ordinary African to carry out. He advocates the use of sun-dried bricks walls of which could last for 25 years. [This paper is very sound. There is no doubt that many African natives are willing to adopt a better standard of housing and that careful guidance is necessary to foster this desire.]

C W

BUXTON (P. A.) Temperatures Lethal to the Louse.—*Brit Med J*
1940 Mar 2. p 341 With 2 figs

The author describes the apparatus with which he worked. It consists of a test tube inserted into a thermostat. This is not removed when an experiment is started but the lice are introduced into it *in situ*. Temperatures are measured in a second tube alongside. Humidity was not considered to be of importance in this work.

The lice were in good condition and the lowest temperatures found to kill all lice adults and larvae were 51.5°C. for 5 minutes, 49.5°C. for 10–30 minutes or 46°C. for 45–60 minutes. Females which have been exposed to temperatures just below the lethal lay unfertile eggs. For eggs under 5 days old the lowest lethal temperatures are 53.5°C.

macrocytic anaemia in non-pregnant mulatto women. The first was a hyperchromic anaemia and was thought to be due to a nutritional deficiency the basic articles of the patient's diet being rice, beans and native tubers while meat, dairy products and fresh vegetables were rarely eaten. The character of the stools, the absence of intestinal symptoms and the presence of gastric hydrochloric acid were against a diagnosis of either sprue or pernicious anaemia. Improvement occurred after treatment with liver extract but the patient soon relapsed after leaving hospital, perhaps because of her age and economic circumstances. In the second case, the anaemia was hypochromic and an iron deficiency seemed to be the complicating factor as improvement failed to occur until treatment with iron was added.

F Murgatroyd

MCHENZIE (Alan) The Influence of Hospitalisation upon Weight and Haemoglobin.—*East African Med J* 1939 Sept. Vol. 16. No 6 pp 210-219 With 1 fig

In Tanganyika Territory the dietary habits of the tribes are so diverse that it is improbable that any general standard can be defined. Of the patients admitted to the Morogoro hospital 723 were, however roughly classified into three classes (A) the native general population (B) the estate labourers (C) the better class natives. Of these the first two rarely eat meat, the last consumes relatively large quantities. The patients were further classified according to disease groups.

The diet in the Morogoro hospital was found to average 2,470 calories per man day with 80 gm. protein (of which 23 gm. are of animal origin) per day.

The patients were weighed on admission and discharge and an estimation of haemoglobin percentage was made at the same times. It was found that in classes A and B the mean gain in weight was between 4 and 5 lbs. in class C (heavier on admission) it was less than 1 lb. The largest gain (over 8 lbs.) was found to be in the group of tropical ulcer patients.

As the gains of class C are so much lower than those of A and B it appears reasonable to assume that the figures are more closely related to the state of nutrition prior to admission to hospital and are a measure of the degree of malnutrition that then existed. The influence of height was estimated in 222 patients and the difference in weight in these patients was still found to be highly significant in the same groups as before. The high increase in the group of tropical ulcer patients was taken as evidence that in the aetiology of this condition malnutrition, and especially the lack of meat in the diet, is a potent factor. (In this connexion it is stated that estate labourers provide the largest proportion of these ulcer cases. Is it not possible that the conditions of estate work, especially on sisal plantations, may provide more than the usual opportunities for slight wounds or contusions of the legs which may form the starting point of these ulcers?)

The average gain in haemoglobin over the whole series was 7 per cent. and was again greatest in classes A and B. A group of long term prisoners (whose diet contains 24 oz. meat weekly) was divided into two sections one of which was treated with an average of 6 grams of iron daily. After one month it was found that the haemoglobin in the treated group rose from 81.41 to 91.59 per cent. while the untreated

group remained unchanged. This shows that the iron intake is abnormally low possibly owing to the deficiency in the diet or to the constant drain by ankylostomiasis malaria or schistosomiasis. But it is certain that the almost universal anaemia that exists among Africans can be improved by an increased iron intake and that among those natives accustomed to eat meat a higher average haemoglobin content is found. Full statistical methods are employed in arriving at these conclusions.

[The author does not make any sex or age distinction in the groups discussed but it is probable that most if not all of the patients were adult males]

C IV

FAVORITE (G O) An Instrument for obtaining Bone Marrow—*Jl Lab & Clin Med* 1938 Nov Vol. 25 No 2. pp 199-201 With 3 figs.

The author describes the instrument which has the advantage over the usual needle in that the material obtained is much more cellular in composition and over the trephine in that the procedure is less difficult. It consists of a No 11 gauge cannula and trocar which both penetrate the skin over the sternum (usually the gladiolus). The cannula is pressed home to the periosteum and the trocar is then withdrawn and replaced by a drill. A firm turning movement of the drill allows it to catch in the bone and thereafter it will proceed by mere rotation until it reaches a prearranged depth at which its progress is stopped by locking nuts. Further rotation forces the marrow substance into the grooves of the drill which is then withdrawn and the marrow may be removed for smear or section. The small puncture made is easily closed.

[It is possible that this instrument may be useful in the diagnosis of certain tropical diseases. The instrument is manufactured by the Scientific Equipment Co Philadelphia]

C IV

LUND (E E) & DENNIS (E W) Studies on the Intestinal Protozoa of Man in Syria and Lebanon. II. A Survey of the Incidence and Distribution of Intestinal Protozoa in the General Population.—*Trans Roy Soc. Trop Med & Hyg* 1939 Nov 25 Vol. 33 No 3 pp 319-334 With 3 figs. [13 refs.]

In a previous paper the authors gave an account of the investigation of hospital patients in Beirut Syria for intestinal protozoa. In this paper an account of a survey carried out in a number of small towns and villages is given. Generally the incidence amongst the rural population was about twice that of the hospital patients in Beirut itself. The following figures were obtained—*E histolytica* 12.9 *E coli* 31.6 *E nana* 26.3 *I. bilis* 11.47 *G. intestinalis* 10.02 *C. mesnili* 11.95 [See this *Bulletin* 1938 Vol. 35 p 577]

C M Wenyon

KMECZA (Joseph M) The Incidence of Human Intestinal Parasite Infections among Patients in a State Institution of Indiana.—*Amer Jl Trop Med* 1939 Nov Vol 19 No 6 pp 515-530 [34 refs.]

The examination of 565 male and 635 female inmates of the Lough Cliff State Hospital Logansport has shown that 51.8 per cent were harbouring intestinal protozoa or helminths. The following percentages

were found — *E. histolytica* 0.2, *E. coli* 31.3, *E. nana* 37.7, *I. butschlii* 3.2, *G. intestinalis* 1.8, *E. vermicularis* 1.6 while one instance of a *Diphyllobothrium latum* infection was noted. C M W

WERNICH (D. H.) Studies on *Dientamoeba fragilis* (Protozoa) III. Binary Fission with Special Reference to Nuclear Division.—*Jl Parasitology* 1939 Feb Vol. 25 No. 1 pp 43-55 With 54 figs. on 2 plates.

The paper describes and illustrates in two plates the process of nuclear division in *Dientamoeba fragilis*. This takes place by mitosis, in which four chromosomes are formed as well as a desmose uniting two division centres which have been developed from a single one. The nuclear membrane remains intact and finally the nucleus divides into two by constriction of the membrane, the two daughter nuclei remaining connected for some time by the desmose. In previous accounts the author described one of the granules in the nucleus as an endosome. It has now been observed that this is actually one of the four chromosomes but it differs from the others in that it is connected with the division centre. Following nuclear division the cytoplasm may divide, but this is usually delayed till a second nuclear division has occurred giving rise to two binucleate amoebae, the forms most commonly encountered in any infection. C M W

POWER (Ann) An Attempt to Infect Animals with *Isospora belli* — *Trans. Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33. No. 3. pp. 357-358.

With material obtained from a case of *Isospora belli* infection in Palestine an attempt was made to infect three monkeys, two puppies and one kitten by feeding with oocysts which had developed to maturity in bichromate solution. In no case did an infection result, though a single ripe oocyst was found in the faeces of one of the monkeys four days after ingestion of oocysts. C M W

STONE (Wm. S.) & REYNOLDS (Francis H. K.) A Practical Method of obtaining Bacteria-free Cultures of *Trichomonas hominis* — *Science* 1939 July 28. Vol. 90 No. 2328 pp 91-92. With 1 fig.

The note describes a technique by which trichomonas may be made to migrate from a bacteria-containing medium along a capillary tube filled with sterile culture medium. Along the capillary tube occur a number of loops or traps which have the effect of permitting the passage of the flagellate but not of the bacteria. The presence of flagellates in the tube can be determined by microscopic examination. Portions containing flagellates can be broken off and introduced, after sterilization, into culture tubes. In this way sterile cultures of the human trichomonas have been obtained on a number of occasions.

C M W

AMOLICH (Arthur L.) & WAX (John H.) Histoplasmosis in Infancy Report of a Case.—*Amer Jl Path.* 1939 July Vol. 15 No. 4 pp 477-481 With 4 figs. on 2 plates [11 refs.]

The case recorded is that of an infant who died at the age of 8 months after an illness characterized by chronic paroxysmal cough, anaemia,

leucopenia continuous fever weakness and hepatic splenomegaly. The diagnosis was not established till after death when the organism *Histoplasma capsulatum*, was found in the spleen which had been removed during life the only organ available for examination. Subsequently the examination of blood films made during life revealed leucocytes containing parasites. The most striking change in the spleen was a very marked proliferation of the reticulo-endothelial cells. The present case of this disease brings the total number on record to 10 of which 8 were in adults. C M W

SHAFFER (Frank J) SHAUL (John F) & MITCHELL (Reginald H) *Histoplasmosis of Darling Fourth Case to be reported in United States.*—*Jl Amer Med Assoc.* 1939 Aug 5 Vol. 113 No 6 pp 484-488 With 4 figs

The case described is that of a child 11 months old who died of a febrile condition associated with enlargement of the liver and spleen and anaemia. A diagnosis was not made till after death when the characteristic parasites were discovered in the organs. C M W

DE MONBREUN (W A) assisted by Katherine ANDERSON The Dog as a Natural Host for *Histoplasma capsulatum* Report of a Case of Histoplasmosis in this Animal.—*Amer Jl Trop Med* 1939 Nov Vol. 19 No 6 pp 565-587 With 9 plates. [20 refs.]

The case reported is that of a bull terrier belonging to a physician of Nashville Tenn. The animal became ill and developed a condition which was diagnosed as cirrhosis of the liver with ascites. Blood stained fluid was withdrawn from the peritoneal cavity on several occasions. A laparotomy was performed and a portion of the greatly enlarged liver was removed. In sections of this the characteristic changes together with the parasite of histoplasmosis were found. Cultures were obtained from the blood before death and from the organs at the post-mortem examination and with them other dogs were infected and the disease reproduced. It was clear that the organism was *Histoplasma capsulatum* and that the case reported is the first instance of the disease occurring naturally in an animal.

C M W

NEGRONI (P) Estudio micológico del primer caso argentino de *Histoplasmosis* [Mycological Study of the First Case of Histoplasmosis in the Argentine.]—*Folia Biol* Buenos Aires. 1939 Sept-Oct.-Nov-Dec. Nos. 90-91-92-93 pp. 390-391

From a case of histoplasmosis to be described by NEGRONI BALINA and HERRERA cultures of the organism *Histoplasma capsulatum* were obtained. In this short note the author gives the cultural characters on various media he has employed for its cultivation. C M W

RUPDOCK (John C.) & HORX (Robert B.) *Coccidioides immitis* Diagnosis by Peritoneoscopy.—*Jl Amer Med Assoc* 1939 Dec. 2. Vol. 113 No. 23 pp. 2054-2055 With 1 fig

A Japanese aged 35 years, born in Hawaii, came to hospital at Los Angeles complaining of abdominal pain and swelling dating from two weeks before. He was a heavy drinker. The abdomen was distended with fluid, and the diagnosis made was Laennec's cirrhosis of the liver. Four litres of straw-coloured fluid were removed, but it re-accumulated in a few days. Exploratory operation revealed dense adhesions of omentum and peritoneum with milinary tubercles, which on section were found to consist of *Coccidioides immitis* and this was also cultivated. For the next three weeks the patient was subjected to repeated paracenteses and ran a septic temperature to 100°-102°F. Then pleural effusion developed this was aspirated and culture again demonstrated *Coccidioides*. Death took place five weeks after his first admission. At autopsy there was generalized peritonitis and bilateral pleurisy both coccidioides in nature and a similar infection of spleen liver and left kidney. The patient denied having lived in San Joaquin Valley. H H S

YUGIAN (Dinan) & KEGEL (Richard) *Coccidioides immitis* Infection of the Lung. Report of a Case resembling Chronic Pulmonary Tuberculosis.—*Amer Rev Tuberculosis* 1940 Mar Vol. 41 No. 3 pp 393-397 With 7 figs.

A married woman of 25 years of age complained of cough of three years duration. Her mother is said to have died of phthisis. From the age of 4 to 11 she lived at Tulare St. Joaquin Valley California. She then went to New York and six years later was married. After the birth of a child she felt persistent fatigue and lost weight, she suffered from cough and was told she had pulmonary tuberculosis. X-ray showed scattered shadows. Sputum was blood streaked and twice she had a copious haemoptysis—100 cc. at one time and eighteen months later 60 cc. Repeated examinations failed to reveal any tubercle bacilli but spores were seen which grew on Sabouraud's medium and proved to be *Coccidioides immitis*. Prolonged treatment at a sanatorium resulted in no material change in her condition, but there was some clearing of old lung shadows and formation of new ones.

It is thought that the infection was acquired during her stay in St. Joaquin Valley though no symptoms were noticed till six years later. H H S

VASSALLO (S. M.) Creeping Eruption. [Correspondence].—*Trans Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33 No. 3 p 359

In Zanzibar the author successfully treated 22 cases of creeping eruption with X-ray radiation. Only two required a second treatment. The data are 70 kilovolts, 5 milliamperes through a 5 mm. filter tube distance 30 inches time of exposure 30 seconds. Irritation is allayed in a few hours and there is no sign of the larva after three days. Other treatments had previously been unsatisfactory. C W

REVIEWS AND NOTICES.

Manson's Tropical Diseases A Manual of the Diseases of Warm Climates—Edited by Phillip H MANSON B.A.H. C.M.G. D.S.O. M.A. M.D. D.T.M. & H. Cantab. F.R.C.P. London Senior Physician to the Hospital for Tropical Diseases London etc. Eleventh Edition Revised.—pp xvi+1083 With 18 colour plates 15 half tone plates 364 figures in the text, 6 maps & 28 charts. 1940 London Toronto Melbourne & Sydney Cassell & Co Ltd [35s]

Manson's Tropical Diseases as edited by Dr Manson Bahr continues to maintain its place *facile princeps* among manuals of the diseases of warm climates. Tropical medicine not only in its entomological, protozoological and helminthological aspects but also in the clinical and therapeutic is making continual advances now with faltering steps anon with rapid strides and who could gauge its progress better than a physician in busy practice and especially one who combines at all times clinical observation with pathological investigation? We cannot give greater praise than to say that the standard of former editions has been fully upheld in this the most recent issue. By judicious employment of small type and by re-arrangement evidently carefully considered and by cautious elimination of dead wood new matter published in the past four and a half years since the tenth edition was issued has been incorporated without materially adding to the size of the book which is only 80 pages larger than the edition of 1935.

Two excellent chapters on Life in the Tropics have taken the place of the Introduction of previous editions. The first contains valuable hints to those whose duty it may be to examine as to their fitness for life in the tropics persons going abroad either for the first time or on their returning thither after a period of leave. The physiological and the pathological effects of climate are briefly but adequately discussed. The second chapter considers clothing and general hygiene and nutrition. The remarks on diseases of temperate climates as influenced by tropical conditions are of the greatest interest but it is not easy to see why sickle-cell anaemia, Cooley's anaemia and the anaemias of pregnancy should be dealt with in an introductory chapter on Life in the Tropics any more than say hookworm anaemia or ectopic gestation. Perhaps it was difficult to find a fitting place in the body of the work unless a separate chapter on anaemia in the tropics were written and this would not be easy if the vain repetition of the heathen were to be avoided.

To come to matters of more detail. The malaria and blackwater fever sections have been subjected to considerable re-arrangement so that though new matter has brought it fully up to date by placing some of it in the protozoological section of the appendix together they occupy twenty pages less in the body of the work than they did in the previous edition and this tends to facilitate study and revision. The illustration of the method of spleen palpation (p. 96) is retained and is typically German in origin the expression on the face of the examiner is clearly that of aggression for protective purposes and on that of the patient a dreaded expectation of rupture of his spleen.

describes a spirochaete in the skin and superficial lymphatic glands of pinta cases, resembling *S. pallida* (this *Bulletin* 1940 Vol. 37 p 104). The Wassermann reaction is usually positive in pinta. PARDO-CASTELLO expresses the view that pinta bears the same, or a similar relation to syphilis as does yaws. More recently LEON Y BLANCO has found virulent spirochaetes in the sweat and discharges over an exfoliated site, but he showed that there was no cross-immunity between pinta and syphilis, since primary syphilis may occur in a pinta subject and *vice versa*.

Another important addition is a section on *rhinoderma* with an excellent illustrative photograph of a patient. In the *onyxiasis* section (p. 712) more stress might be laid on the resemblance and possible connexion between it and thrombocytopenic purpura. The decrease in platelets the prolonged bleeding time with normal coagulation time and the results of autohaemotherapy may afford a basis for future research, especially when we bear in mind the views of American workers that thrombocytopenic purpura is a manifestation of food allergy. In the chapter on vegetable poisons mention should be made of the work of LEIGH EVANS and ARNOLD in 1938 with evidence in support of, if not actually confirming, the suggestion made by SCOTT in 1915 that the active toxic principle of *Blighia sapida* is a saponin.

The list of snail and fish intermediaries of *Clonorchis* (p. 868) is another new and important addition also the *Onchocerca* illustrations on pp. 786 and 787.

Omissions which will, we think, be regretted by readers are *Coccidioides immitis* and San Joaquin Valley fever. Jake paralysis among food poisonings, and, more than these, the chapter on the technique of intravenous injections, on the estimation of haemoglobin and the colour index, and on dark-ground illumination. All these last should, of course, be taught in the classes of instruction for those going to the tropics, or even earlier in the ordinary medical curriculum, but we feel fairly safe in saying that, though taught, they are not learnt. We ought not, however to grumble at a few omissions in a book crammed full of good things—moreover we are given instead the examination of the urine in malaria and the testing for quinine and atabrin really perhaps of greater importance where saving of space is a desideratum. The author—for Dr Manson-Bahr now carries out more than the editorial functions which is all he modestly claims—has often orally acknowledged his indebtedness to the *Tropical Diseases Bulletin* but this does not yet find expression in the preface among the other acknowledgments in the present edition any more than it did in the tenth.

Misprints are very few and nearly all those in the previous edition have been corrected. There still remain haemotobia, morocanus, Sovensen, Pfeifferia, demyelated, hyperpyrexia. Lathyrus surely is feminine and has Wucherer a modified "u"? If the name is derived from the trade (or is it a profession?) it should be Wucherer. But these are matters of little moment. It is good to see "aetiology" properly and correctly spelled throughout the new edition. The fact remains that in this eleventh edition we have an authoritative work which, for its size accuracy of detail, balance of information and clarity of exposition is unsurpassed. The work should be in the hands of every practitioner in the tropics and we feel certain that the interval between this and the twelfth edition will be shorter than that between the last edition and the present, for it is a work which must not be allowed to go "out of print."

H H S

FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE Comptes-Rendus du Dixième Congrès, Hanoi, 26 Novembre-2 Décembre 1938. [Proceedings of Tenth Congress Hanoi 26 November-2 December 1938]—Volume I pp lxxii+1057 With numerous plates charts & tables 1939 Hanoi Imprimerie d'Extrême-Orient

This is volume I of the Proceedings of the Tenth Congress of the Far Eastern Association of Tropical Medicine which was held at Hanoi from 26th November to 2nd December 1938. It is a handsome book over 1100 pages and the contents are subdivided into two main parts the first dealing with the business matters of the Congress the second with the many scientific communications. The latter in this volume are divided into six sections devoted to Cancer General Hygiene Nutrition Pharmacology Anthropology and Surgery to each of which several papers were contributed and are here printed in full. Altogether 75 articles are reproduced. A few which have been issued separately have already been abstracted or noticed in this *Bulletin* others sum up past knowledge and do not call for special detailed mention here. Some however bring forward new facts or fresh considerations and consequently the most important must be referred to. Much as we would like to do so we cannot in the space at disposal deal adequately with them all. Most of those calling for special notice come in the Nutrition section. A very informative article on the Nutritive Value of Rice by Professor ROSEDALE will be abstracted separately in a later number of this *Bulletin*. Another by Colonel TOULLEC summarizes clearly our knowledge of the symptomatology of beriberi or of deficiency of vitamin B₁. He divides the symptoms conveniently under digestive disturbances cardiovascular oedema endocrine upset and nervous conditions. Dr MEYERS of Sumatra contributes an interesting note on the oedema of beriberi. He discusses again the question of toxin in beriberi production and states that there are two possibilities one that the polyneuritis is the direct result of aneurin deficiency or secondly that there is a reduction of it to such a degree that the action of a toxin is facilitated. If aneurin effectively cures the disorder which produces oedema, there must be some unknown factor of an endogenous rather than exogenous character which causes the oedema and in support of this thesis he mentions the fact that beriberi patients may show oedema for some days and that this may spontaneously disappear. It is not clear (to the reviewer at least) that there must therefore be present in the organism some unknown regulating factor capable of inhibiting the oedema.

Dr H C HOU of the Lester Institute Shanghai contributes an article of more than local interest on the incidence of beriberi in Shanghai its types and the results of treatment with vitamin B₁, estimating the blood pyruvic acid and the urinary excretion of the vitamin at frequent intervals. He analyses the results in 674 cases of acute and chronic beriberi divided into five main groups namely latent mild chronic subacute acute and chronic paralytic beriberi. In acute beriberi energetic symptomatic treatment with adrenalin or coramin for example is essential to tide over the critical interval before the effect of the vitamin B₁ can manifest itself, some 6-12 hours.

Other contributions of particular value include one by HUARD and MEYER-MAY on Liver Abscess in Indo-China an interesting

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compilation amply documented by close on 150 references and with several clear drawings. Another by CHEN LIANG HSU and FA-CHU CHANG on an X-ray Study of the Lung and Pleura in Amoebic Abscess of the Liver giving details of several cases illustrating particular points and a discussion of six cases. As many as twelve showed normal lung and pleura but the diaphragm was raised in seven of them. The X-ray photographic reproductions in this article are unfortunately too poor to reveal much of value in spite of a detailed descriptive text. Another brief article deals with hepatic and pulmonary ascariasis and the difficulties in its diagnosis. One on the Visualization of Amoebic Liver Abscess by Drs. HUI LAU CHUNG F Y KNOO and S K P CHANG has been separately abstracted for this Bulletin [1939 Vol 37 p 119]. Let us hope that the second volume if one is to be published will appear before the contents have time to become out of date. If the standard of this volume is maintained, the whole will constitute a valuable work of reference on the progress of tropical medicine.

H H S

TROPICAL DISEASES BULLETIN

Vol. 37]

1940

[No. 8

SUMMARY OF RECENT ABSTRACTS *

VII HELMINTHIASIS

General

FAUST *et al* (p. 144) report a preliminary investigation on the efficiency of various techniques for the examination of faeces for protozoan cysts and helminth eggs. The highest counts were obtained by direct counting in iodine solution of known volumes of homogeneous emulsions and by a direct centrifugal floatation method using zinc sulphate solution of specific gravity 1.180 as the diluting fluid. Further work was in progress at the time of reporting and reference to later results may be made to this *Bulletin* 1940 Vol. 37 p. 62 and to a critical assessment by LANE of the methods used this *Bulletin* 1940 Vol. 37 p. 477. D'ANTONI and ODOM (p. 829) investigated the proportion of hookworm eggs held back by a metal sieve of 60 meshes to the linear inch when faecal suspensions were strained through it. They estimate that with the faeces of a patient on normal diet the percentage of eggs remaining in the sieve is about 2.5. In comment LANE points out that a sieve of 100 meshes to the linear inch holds back from 35 to 60 per cent. of eggs even when tested by the levitation method, which itself is inadequate to show as high a proportion of eggs as the D.C.F.F. technique. He also draws attention to the fact that hookworm eggs are sticky in watery solution. SAWITZ *et al* (p. 830) estimate the specific gravity of *Necator* eggs as about 1.055 (roughly for practical purposes) but LANE states that for dependable floatation a solution of specific gravity 1.100 is inadequate and 1.150 is necessary. ANDREWS (p. 594) gives in a table results showing the comparative values of several methods of detecting worm eggs in faeces.

POKROVSKY and ZHIS (p. 589) found worm eggs on 0.47 per cent. of 1,911 flies in Russia, principally on their legs.

CULBERTSON (p. 590) summing up modern views on the subject of immunity to helminths states that most workers tend to assume the point of view that immunity is developed and that the humoral and cellular responses of the host are similar to those associated with

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

other infectious agents. AFRICA and DE LEOX (p 589) studied the tissue reactions which occurred after the intraperitoneal injection of certain worm eggs into *Muscaus cynomolgus* and in the case of *Schistosoma japonicum* in human tissues. With eggs of *Ascaris*, *Fasciola gigantica* and *S. japonicum* formation of giant cells took place and these cells in the case of *Ascaris* engulfed the eggs especially if embryonated causing them to disappear. In the case of *Fasciola* the giant cells appear to exert pressure on or to penetrate into the egg, either crumpling or bursting it and with *Schistosoma* there is fracture of the shell, pressure upon it and a tearing action. Heterophyid eggs do not make giant cells but only histocytes and endotheliocytes. The authors attribute this to negative chemotaxis.

Survey of helminthic infestation in various parts of the world are reported on pp 35 36 144 (by post-mortem) 591 (twice once by post-mortem) 592 (twice) 593 (three times) 594 (twice) and 618. These cannot be abstracted and are principally of local interest.

Trematodes

S. isthmosomes—GOSALL (p 38) reports heavy incidence of *S. haematolum* and *S. mansoni* infection in the flat country bordering Lake Niassa. As no *Planorbis* snails could be found and as penetration of *Limnaca laevis* by miracidia of *S. mansoni* was observed it appears probable that this snail may be responsible for transmission of *S. mansoni*. *Bulinus africanus* (*Ph. africana*) is probably the intermediate host of *S. haematolum*. Intravenous antimony tartrate is the most effective treatment.

Discussing schistosomiasis (and ankilostomiasis) in Egypt SCOTT and BARLOW (p 36) show that there are found fluctuations in prevalence and intensity of infection which cannot be correlated with known causes. Greater changes, however all in the direction of reduction have followed the administration of as much treatment as the people could be persuaded to take. Bore-hole latrines have not apparently been effective in reducing incidence but it is pointed out that these are usually constructed in villages and since infection is only transmitted under field conditions it can hardly be expected that house sanitation can affect it significantly. The people should therefore be taught to accept and use latrines in the field and should be educated to avoid pollution of water. These measures should be associated with snail control and drug treatment though only temporarily effective should not be abandoned.

MARTINS and DOS ANJOS (p 618) believe that schistosomiasis has recently been introduced into the N.E. region of Brazil and found incidence varying from 3.22 per cent. to as much as 85.18 per cent. in parts of the State of Minas Geraes. The general incidence was 29.73 per cent. In Belo Horizonte MARTINS and VERLAXI (p 39) identified *Planorbis glabratus* as an intermediate host of *S. mansoni*. HOFFMAN (p 619) as a result of careful observations concludes that *Planorbis cornus* cannot be infected with miracidia of *S. mansoni*. The snail has been introduced into aquaria in Porto Rico in place of *P. glabratus* which is a known host of the schistosome.

MARZEN (p 39) claims that bilharzial asthma is an allergic phenomenon dependent upon constitutional factors and substances liberated in *S. haematolum* or *S. mansoni*. It does not depend on lesions of the lungs brought about by the parasite since pulmonary infection is constantly found in schistosomiasis, and the allergenic nature of the condition is

shown by its association with urticaria and by its hereditary transmission. That it is due to schistosome infection is demonstrated by the complete parallelism in the course of the two conditions after specific therapy. He (p 620) describes the X-ray appearance of pulmonary schistosomiasis—distinct foci varying in size, density and distribution, increased striation, enlarged and intensified hilar shadows. Cough, fever and wasting may simulate tuberculosis and after the destruction of the parasites contracting fibrosis may constrict bronchioles or vessels.

MAINZER (p 620) states that increase in blood eosinophilia after antimony treatment in a suspected case of schistosomiasis favours a diagnosis of that condition.

EL GAZAYERLI (p 619) found a male schistosome in the circumflex branch of the left coronary artery of a patient in Egypt who had died of meningitis. Bilharzial lesions were present in the lungs, rectum, appendix and urinary organs, but eggs of *S. haematobium* only were found in scrapings.

CANSTON (p 620) draws attention to the danger of passing a cystoscope in a patient with untreated schistosomiasis—most cases of bacterial infection can be traced to this procedure. He states that a solution of tablets containing tartar emetic and sodium chloride which has been filtered before sterilization is far less likely to produce coughing on intravenous injection than one which is not filtered. DIAMANTIS (p 622) advocates a mixed antimony and emetine treatment in quantities below the lethal dose of each and emphasizes the sudden and unforeseen character of the many antimony deaths in Egypt. KUNERT (p 622) reports on the results of sodium antimony tartrate treatment.

ASHKAR (p 621) reports considerable success in a small series of patients treated with anthiomaline. The drug was given intramuscularly in 6 per cent solution and the dose was raised at the third injection to 1.0 cc. for each 15 kgm. body weight given usually every other day. It is more toxic than foudrin and may produce unpleasant symptoms which however are usually not serious. IMPALLOMENTI (p 621) has used Stibional B with success in doses rising to 10 cc intravenously and given on days 1, 2, 3, 5, 6 and 7 or longer if necessary. It may produce temporary fever but appears to be efficient. In urinary schistosomiasis DAVID (p 622) reports that Dicuiprene and Cuproquine were unsuccessful.

WILLIAMS (p 38) reports schistosomiasis from part of Szechwan Province not hitherto known as an endemic area. Eggs were found in an excised appendix and *Oncomelania* snails were found in the area in question.

TANG (p 37) reports on the morphology of the miracidium and cercaria of *S. japonicum*. Adult *S. japonicum* were maintained alive by HOEPLI *et al.* (p 35) for five months at 37°C in horse serum either pure or diluted with Tyrode solution and were used in experiments on the effect of drugs on their survival time.

CAMPBELL (p 40) suggests that a large proportion of oriental cases diagnosed as splenic anaemia, Banti's disease, cryptogenic splenomegaly, etc. may in fact be due to schistosomiasis. That eggs cannot be found in the stools is not adequate evidence against their presence in the intestine since they may be recovered by duodenal sound in such patients. The first step in the operation of splenectomy should be the

immediate examination of frozen liver tissue for schistosome eggs. If these are found splenectomy should not be performed.

For the control of *S. japonicum* infection, MIYAJIMA (p. 623) advocates for *Oncomelania nosophora* in water the damming up of ditches for 24 hours and the addition of quicklime to make a 1 per cent. solution, and for these snails in mud the application of a steam jet. These measures have been followed by a notable reduction in infected persons.

BUCKLEY (p. 40) describes a form of dermatitis found in Malaya and caused by *Schistosoma spindale*. The wearing of boots and putties may prevent the itch.

Other trematodes—In stool examinations in Canton OTTO *et al* (p. 41) found 49.8 per cent. infections with *Clonorchis sinensis*. eosinophilia is a feature. *C. sinensis* has been found by KOURI *et al* (p. 626) in from 23 to 49 per cent. of Chinese in Cuba. NIETO ROARO and CABALLERO (p. 624) have also found it in Chinese in Mexico and discuss the possibility of its transmission. The fish hosts are present but *Bithynia* is not found. HOEPLI *et al* (p. 35) used a mixture of serum and Tyrode solution, or undiluted heparinized rabbit plasma for maintaining adult *C. sinensis* alive at 37°C during experiments on the effect of drugs on the fluke. Survival for five months was achieved when the medium was changed weekly. Metacercariae lived as long as two weeks but no development occurred.

Leucopodia gracilis (OKAER, p. 46) and *Callicrinus kuroi* (MUTO p. 624) have been reported as second intermediate hosts of *C. sinensis*.

KINUGASA (p. 624) reports that fowadin is useful in the treatment of *C. sinensis* infections. Studying *C. sinensis* *in vitro* CHU (p. 623) found that gentian violet malachite green and Nile blue were lethal in 24 hours in a concentration of 1:40,000 which approaches a concentration which might be used for treatment *in vivo*. Of these gentian violet was the most effective.

Human infection with *F. hepatica* has been known in Cuba since 1931 and KOURI *et al* (p. 626) note that a single examination of faeces is not enough to exclude the presence of the fluke. Emetine is specific but may fail probably owing to fibrous encapsulation of the worm. BACIGALPO (p. 628) shows that *Limnaea stagnalis* is an effective host of *F. hepatica* in Cuba. RODRIGUEZ MOLINA and HOFFMAN (p. 40) report two cases of infection with *Fasciola hepatica* one was apparently cured with emetine. MANDEAUX and ALCAY (p. 626) note eosinophilia of 21 to 28 per cent. in a case of infection with *F. hepatica* in which symptoms of appendicitis were present. The infection did not respond to emetine. BURGI (p. 626) describes infection with *F. hepatica* in a child.

AZUM (p. 628) found heterophyids in 59 to 75 per cent. of dogs and in 90 per cent. of cats in Egypt. VAZQUEZ-COLET and AFRICA (p. 42) name fish intermediate hosts of *Monorchotrema yokogawai* and *Diorchi trema pseudocirrata*.

BUCKLEY (p. 627) found *Fasciolopsis buski* in 59.7 per cent. of persons in a district of Assam and showed experimentally that *Serpentaria trochoides* is an intermediate host.

Infection with *Paragonimus* was found by KINUGASA (p. 627) in schools in the Simiku Prefecture to vary from 0 to 6.25 per cent. Wasting, cough, haemoptysis, pain, weakness and asthma were common symptoms and the intellectual powers were affected. Children of fishermen were more often infected than others.

Gastrodiscoides hominis is present in 41.2 per cent of the population of part of Assam. BUCKLEY (p 627) reports that soap and water enemas are effective in removing the worms but was unable to find the snail hosts.

VAN DEN BERGHE and DENECKE (p 628) report infection with *Microcoelium dendriticum* in two Europeans in the Belgian Congo but none in the natives though local monkeys have been found infected. The infection has not been looked for in sheep or snails. It was probably acquired through eating uncooked vegetables.

Cestodes

Cyclophyllidea—VILJOEN (p 254) reports the incidence of measles in swine and cattle in the Union of S. Africa and the common anatomical site of the infections. *C. cellulosae* frozen for five days was not viable but for safety freezing at -10°C for seven days is advised if the carcass is not too fat or for 14 days for greater certainty. Treatment of human carriers of worms and close inspection of abattoirs are recommended for eradication.

DE SÈZE *et al* (p 253) state that in the examination of the cerebrospinal fluid excess of lymphocytes, positive colloidal benzoin reaction in the first 10 or 12 tubes and eosinophilia, in the absence of a positive Wassermann indicate a definite diagnosis of cerebrospinal cysticercosis. An editorial note gives the details of the colloidal benzoin reaction. HARE (p 252) reports two cases of cerebral cysticercosis with epileptiform fits and a condition of hydrocephalus.

CASTELLANI and ACANFORA (p 254) report massive cysticercosis in the skin, heart and brain of a girl who developed tachycardia and died in an epileptic attack. They refer to a case of luetic pseudocysticercosis which disappeared under treatment with neosarsphena mine. EVANS (p 719) reports a patient with a massive cysticercosis and a history of epilepsy who had a remarkable athletic record and whose physical powers were apparently not affected by the condition. SEGAL (p 719) reports a case of cysticercosis of the right iliac bone at first diagnosed as chronic osteomyelitis. HIYEDA and TERADA (p 717) report favourably on further experience with Raigan (*Omphalia lapidescens*) a kind of mushroom used in the powdered state in doses of 20 grams three times a day for three days without preparatory treatment or purgatives in the treatment of infection with *T. solium*, *T. saginata*, *H. nana* and *H. diminuta*. The dose of the extracted active principle is 0.4 grain but its nature has not yet been determined.

BARNETT (p 251) gives figures of the incidence of and deaths from hydatid infection in Australia and New Zealand during 1937 with particulars of the anatomical distribution.

CHUNO and T'UNG (p 715) state that both the Ghedini-Weinberg complement fixation reaction and the Casoni intradermal test are group immunological reactions rather than specific tests since both may be positive in either hydatid disease or cysticercosis whether hydatid or cysticercus fluid is used as antigen. The fluid should be diluted 1:4 for the complement fixation test since undiluted fluid often gives false positives in syphilis or other conditions. The serum of patients with kala azar may give a positive result even with fluid diluted 1:8 and this disease must be borne in mind therefore in evaluating a positive result. SERGENT *et al* (p 716) on the other hand

consider that a positive Casati reaction to fluid containing no anti-septic, at the first injection is definite evidence of hydatid disease. Positive results to repeated injections may be obtained in patients in whom there is subsequently found no post-mortem evidence of infection and they are presumably caused by sensitization arising from the earlier injections.

In the diagnosis of *Echinococcus alveolaris* BUHLER and HASSELBACH (p 715) refer to certain points: the tumour in the liver is not associated with any other to which it could be secondary; there may be deep jaundice with comparatively slight subjective troubles; there is eosinophilia; X-ray evidence of calcification and an unusually long history. Only histological examination, however, can give a definite diagnosis. FRIEDRICH (p 252) shows that *Echinococcus alveolaris* is not so rare as is thought and should be suspected in any patient with wasting and a painful liver swelling which resembles malignant disease but does not behave like a true malignant tumour.

ROGERS and TIDHORE (p 253) report successful removal from the spinal canal of a hydatid which had been causing paresis and paraesthesia. They note that the site of election is usually extradural and posterior and that this accessible situation is suitable for operation.

Several papers dealing with the purely clinical aspect of hydatid disease have also been abstracted, but as they contain no new information they are not included here.

BEARUP and MORGAN (p 721) report three human infections with *H. diminuta* and two with *D. cerebrum* in children in Australia.

LIPPO (p 721) reports one human infection with *H. diminuta* in S. Italy and BACIGALUPO and AGUIRRE PEQUEÑO (p. 251) a second case of infection with *H. diminuta* in Mexico.

KOURI and DOVAL (p 720) record infection by *Davamea* in three children: the species was not determined. Treatment with male fern and carbon tetrachloride was successful in one case.

LEÓN (p 720) reports 9 cases of human infection with *Raillietina guineensis* in Ecuador and describes the worm. The definitive host is man but the intermediate host is as yet unknown. Symptoms produced include abdominal pain, nausea, diarrhoea, weakness, headache, vertigo and mental dullness.

ROY (p 255) in Bengal reports the twelfth recorded case of human infection with *Bertiella studeri*.

Pseudophyllides.—In an investigation of the pathogenesis of *Diphyllobothrium anaemia* TOTTERMAN (p. 248) shows that the administration of dried worm or an alcoholic extract of dried worm to patients with a history of this anaemia caused a sharp fall in the number of red cells to as low as a million, but that the haemoglobin did not fall proportionately: the colour index therefore rising. On cessation of administration of the preparations the blood condition improved. Actual infection in these patients produced the same effect. The fact that the residue of the worm powder after alcoholic extraction did not produce this effect shows that it is the alcohol-soluble fraction which is responsible and the extract does not influence the blood of persons with normal blood or cryptogenic pernicious anaemia. The author concludes that the alcohol-soluble components of the worm may produce hypersensitiveness and that the mechanism of production of the anti-pernicious factor is weakened, so that this affection may supervene. In serological examination of the patients investigated by Totterman, STEVENS (p. 249) found that complement fixation reactions

can usually be obtained in persons who have previously suffered from *Diphyllbothrium* anaemia and to whom worm substance or alcoholic extract of worm powder is administered *per os* but not after the administration of the residue left after alcohol extraction only. This reaction is independent of the Wassermann reaction. The period during which the reaction is positive is very brief and is not related to the symptoms of anaemia. The reaction is negative in normal controls but may occur in pernicious anaemia.

As has been reported before MÜLLER (p. 250) differentiates *Diphyllbothrium mansonoides* from *D. mansonii*. He now traces the history of the plerocercoid larvae when swallowed by a host in which it does not become adult. It penetrates the intestinal wall and reaches muscle where it continues to grow. Monkeys harbouring large numbers of these plerocercoids may develop gelatinous swelling of the lower part of the trunk due to burrowing and disintegration of the sparganum in subcutaneous tissues but if the monkeys have been given injections of tape worm substance this does not occur and the plerocercoids are promptly encapsulated. Eosinophilia to 35 per cent may occur. He suggests that *Sparganum proliferum* is an aberrant form of *S. mansonii* or *S. mansonoides*. CORNET (p. 250) advocates surgical measures in the treatment of ocular sparganosis in preference to intravenous injections of novarsenobenzol. In accessible sites surgical treatment is rapid and sure but for retrobulbar infection it may be necessary to inject alcohol or to attract the parasite to superficial sites by applied heat. Acute inflammation indicates bacterial infection. MEIJER (p. 717) states that *D. crinacei* (*D. mansonii* or *D. railleti*) is present in different parts of the Dutch East Indies. It is found in dogs and cats and the plerocercoid occurs in frogs, rats, swine and shrews. PETROV (p. 721) reports the first human case of infection with *Diphyllbothrium skrjabini* a parasite of dogs and with a new species named *D. henzii*. C. Walcotts

[To be continued]

YELLOW FEVER

PRÉCIS OF ABSTRACTS IN THIS SECTION

In the Gold Coast MACKAY (p. 549) reports that 4 out of 5 European cases were apparently contracted in rural areas where mosquito control is impossible but local investigations in these areas failed to disclose any extensive incidence. Mosquito control continues along trade routes and it is realized that with increasing traffic land spread, though slower than air spread, may be more sure. Particular attention is paid to breeding places in tree holes and the importance of vaccination of all Europeans is stressed.

SALEUN (p. 550) reports on investigations into the characteristics of two strains of virus maintained without modification for some years in Brazzaville. He quotes two patients whose sera gave positive protection tests though no fever other than dengue had been experienced. Protection was found in three persons vaccinated 3-4 years previously by Laigret's method but in four recently vaccinated there was no such protection, probably because the vaccine

had deteriorated during transit from Tunis. It is therefore advised that vaccine should be prepared on the spot. Positive tests were found in a number of natives from different areas and in camels, horses sheep goats cattle, one dog and one ostrich. Toxic hepatonephritis resembling that produced by yellow fever was found in the organs of a native who had been given ornamine.

Of 41 pathological specimens examined by BARLET (p. 551) in Paris 17 were found histologically to show lesions of yellow fever. 15 were from French West Africa, and one from Tchad, which has not hitherto been known to be a yellow fever area. SMITH (p. 551) discusses the distribution of yellow fever in Colombia and the extent of the viscerotomy service in that country. SICÉ and RODALLEC (p. 551) record pathological findings in the organs of two foetuses of pregnant women who died of yellow fever in the French Sudan.

DE LOTTO (p. 552) reports from Abyssinia a febrile disease with icterus, blackish vomit and haemoglobinuria. He states that this is not likely to be yellow fever because it is not epidemic, but in comment it is pointed out that yellow fever often occurs sporadically and that further investigation appears to be desirable in these cases.

ATNEY (p. 552) records the finding of *Aedes aegypti* and *A. vittatus* in the Sudan and points out the necessity for identification by an entomological expert. O'BRIEN's report (p. 552) deals with the larval index in various districts of the Gold Coast. KENNEDY (p. 553) records experiments which indicate that *Aedes aegypti* flying against a wind maintains its direction by visual means. It is attracted to moving objects and especially to dark moving objects.

WHITFIELD (p. 554) has written a paper summing up present knowledge on the subject of air transport in relation to the transmission of yellow fever and malaria and on methods of control of insects which may be carried in aircraft. ARNEY (p. 554) gives details of the precautionary measures adopted as regards air travel in the Sudan. At Malakal, where no clinical cases of yellow fever have ever been diagnosed the proportion of positive mouse protection tests given by native sera has risen in the last four years, and the author suggests that the virus may have become attenuated in passing from West to East Africa as a result of local factors. Anti-malarial aerodromes should be 1 km. away from human habitations and should be free from *Aedes*. Medical certificates should be required from passengers and crews coming from infected countries. LE VAN (p. 555) gives an account of the organization of the United States *Aedes aegypti* motorized control unit in Florida.

Jungle Yellow Fever.—ARAGÃO (p. 556) considers that jungle yellow fever must have originated from the adaptation of the urban virus to jungle mosquitoes in comparatively recent times. This entails adaptation to transmission at a lower temperature than is necessary for *Aedes aegypti*. Those mosquitoes which bite during the day are said to be young, which have not yet sucked blood and therefore yellow fever is not transmitted in the daytime, but jungle yellow fever is commonly acquired in the daytime and the author advances the theory that this is only possible when the human skin comes into contact with the virus contained in the faeces of infected mosquitoes, deposited in the woods where the insects shelter. HOFFMANN (p. 556) however considers the jungle form to be the primal natural state.

Vaccination.—JADIX and ARNALDI (p. 557) found that in Europeans living in the tropics vaccination with Laigret's egg yolk vaccine

produced severe reactions although in the natives it did not. The vaccine was found to be liable to produce meningo-encephalitic reactions and should only be resorted to under these conditions in the case of danger such as the outbreak of an epidemic. PELTIER *et al* (p 557) describe the very satisfactory results they have obtained with their method of mixed vaccination against yellow fever and variola by the scarification technique. From Nigeria (p 558) is reported a case of yellow fever in a woman vaccinated four months previously.

PENNA and MOUSSATCHÉ (p 558) show that in serial passage in fowl embryo a virus of the Asibi strain lost its viscerotropic property and most of its neurotropic property in a relatively short period. PENNA (p 558) describes a method for the aseptic removal of chick embryo from the egg by means of fine oxy-acetylene flame to open the shell

C IV

GOLD COAST REPORT ON THE MEDICAL DEPARTMENT FOR THE YEAR 1938 [MACKAY (J M) Deputy Director of Health Service] [Yellow Fever pp 17-21]

During the year 15 cases of yellow fever all fatal, were recorded 5 European 9 African and 1 Syrian. Although this number is small it must be only a small percentage of the total. It is of interest that 4 out of the 5 European patients were foremen employed on road construction and repair work in rural areas where mosquito control is not possible. All presented themselves for treatment at one or other of the centres but subsequent local investigations in no instance traced any extensive implication of the rural area in which the disease had been acquired.

Aedes control requires to be extended for which the present staff is insufficient but in the colony the larval index has been still further reduced from 0.51 in 1937 to 0.40 in 1938. Work is being continued on the Takoradi and Accra aerodromes and although they have not yet been declared anti-malarial the passenger traffic in the latter is steadily increasing.

Mosquito control is confined to the larger centres and ports and to some of the larger villages along the main trade routes so with increasing transport facilities the chances of road borne infection to regions outside the West African endemic area appear to increase yearly. This method of spread is far more difficult to contend with than air borne traffic, and although more gradual may be more sure.

Preventive measures throughout the year comprise careful mosquito control in all the large centres and paying more attention to trees as important breeding sites for *Aedes* as rot holes in mutilated trees containing water. Residential areas still provide the most important safeguard for Europeans. During the last year or so the number of Africans living in these areas has increased very considerably as servants are now allowed to keep wives in their quarters.

A number of Europeans have been protected by inoculation against yellow fever and all should be protected, as most of them have to travel as part of their duties and are liable to be exposed to infection. The quarantine measures during an outbreak of yellow fever profoundly complicate travelling and trade therefore it is considered that all Europeans both official and of the trading community should be protected before sailing for the Gold Coast and that the protection of officials should be made obligatory.

E Hinds

BRAZZAVILLE AFRIQUE EQUATORIALE FRANÇAISE RAPPORT SUR LE
 FONCTIONNEMENT DE L'INSTITUT PASTEUR DE BRAZZAVILLE
 PENDANT L'ANNÉE 1938 [SALEUX (G.)] pp 51-66 — Fièvre
 jaune (Yellow Fever)

A record of investigations on yellow fever including attempts to isolate local strains serum protection tests and the histopathological examination of organs from suspected cases.

The neurotropic Dakar strain has now been maintained in the laboratory for four years without undergoing any modification. In 1937 a local strain of yellow fever virus "S C" was isolated by the inoculation of the blood of an infected European living at Brazzaville into the brain of a white mouse (see this Bulletin 1938 Vol. 38 p. 32). This strain has now undergone 45 passages in mice and seems to be identical with the Dakar strain not only in its general properties but also in its immunological reactions.

Serum protection tests were carried out in 1938 on the blood of 10 Europeans at Port Gentil and two were positive. One of these had suffered from two attacks of dengue in 1931 and 1937 but no other fever during 9 years residence in Gabon. The other in 7 years had also only suffered an attack of dengue but this latter patient came originally from the Antilles and might have been exposed to infection previously. In addition during 1938, a more or less typical case of yellow fever occurred in a European official living at M'Bigou, and after recovery his serum was strongly positive (12,800 mouse units). The blood of a few vaccinated subjects was also examined. Two vaccinated 4 years previously by Lagret's method of 3 injections protected in dilution of 1:6400 and another patient who received a second injection of egg-coated vaccine 3 years later gave a titre of 12,800. One immunized 3 years previously with only two injections, which produced a very severe reaction gave a titre of 640 units.

A certain number of Europeans were vaccinated in 1937 by means of egg-coated vaccine sent directly from the Institut Pasteur of Tunis. Three months later the sera of four of these subjects were tested: two gave absolutely no protection and the other two protected only to a titre of 640 units. These results suggest that the vaccine had deteriorated during transport and show the advisability of preparing it on the spot in the case of any serious outbreak.

Tests carried out in the native population gave 3 out of 12 positive at Fort Roussel (Middle Congo) and 2 out of 15 at Port Gentil (Gabon). On the other hand in Birao (Oubangui-Chari) in the North-East adjoining the Anglo-Egyptian Sudan 8 out of 10 were positive.

The results of tests with various animals in French Equatorial Africa are given in the following table —

Animals	Positive	Negative	Titre in Mouse Units
5 Camels	3	2	640
6 Horses	3	3	640
6 Sheep or goats	3	3	640
4 Dogs	1	3	640
2 Ostriches	1	1	6400
13 Cattle	5	8	640
1 Chimpanzee	0	1	—

The organs of 4 Europeans who died during 1938 were examined histologically and two were definitely positive as regards yellow fever. One of these had lived in the province for a year and the other only 3 weeks. Clinical details are given of the course of the disease in each case.

The examination of the organs of 10 natives dying of febrile infections gave no definite evidence of yellow fever, but the liver and kidney of one patient who had been infected with orsanine showed toxic hepatonephritis resembling that produced by yellow fever. E H

BABLET (J) *Contrôle histologique de la fièvre jaune dans les colonies françaises au cours de l'année 1939* [The Histological Control of Yellow Fever in French Colonies during 1939]—*Bull. Office Internat. d'Hyg. Publique* 1940 Mar Vol 32 No 3 pp 345-347

Details of the histological examination of 41 specimens of organs sent to the Pasteur Institute, Paris, from patients who had died of febrile diseases accompanied by jaundice and developing rapidly. Yellow fever lesions were found in 17 cases, 15 of which came from French West Africa. It is of interest that Senegal, which headed the list in 1937-38, had no cases of yellow fever, which may be the result of intensive vaccination against the disease.

The other two cases came from French Equatorial Africa, one from Gabon and the other from Tchad, the latter being the first case of yellow fever noted in this territory.

The specimens from French American Colonies were all negative.

E H

SMITH (Hugh H) *La investigación y dominio de la fiebre amarilla en Colombia* [Yellow Fever in Colombia and its Investigation]—*Rev. de Hig.* Bogotá, 1939 May Vol. 20 No. 5 pp 4-19. With 5 figs., 2 maps & 2 graphs.

This is a good general account of yellow fever in Colombia bringing the facts of the work done in that country up to April 1939. The author speaks of the introduction of the viscerotome—the instrument is well depicted—and reproduces a clear and instructive map showing the many viscerotomy posts established in Colombia and a graph showing the number of specimens received at the laboratory, month by month since the beginning of 1937. Next is a statement of the distribution of cases of yellow fever in the Republic since 1934 and a map and a graph showing month by month since June 1937 the vaccinations for yellow fever. He concludes with a few remarks on plans for control of the infection by vaccination and anti-mosquito measures. H H S

SICÉ (A.) & RODALLEC (B) *Manifestations hémorragiques de la fièvre jaune (typhus amaril). Répercussions de l'infection maternelle sur l'organisme foetal.* [Haemorrhagic Manifestations of Yellow Fever. Repercussions of the Maternal Infection on the Foetal Organism.]—*Bull. Soc. Path. Exot.* 1940 Feb 14 Vol. 33 No. 2 pp 66-69.

A description of two cases of yellow fever, both fatal, in pregnant Syrian women in the French Sudan. One of these cases showed marked

haemorrhagic symptoms which are comparatively uncommon whilst the other was of the comatose type. Neither of them aborted as a result of the disease but at the autopsy of each a careful study was made of any changes in the foetus. The majority of the organs showed various alterations more or less corresponding with those in the mother but the most marked changes occurred in the liver which showed fatty degeneration dilatation of the sinusoids, and contained much pigment, but cellular necrobiosis was absent. E H

DE LOTTO (Enrico) Il quadro nosologico tra gli indigeni dell'estremo ovest etiopico (Beni Sciangul) nei suoi aspetti più caratteristici. [The Characteristic Diseases of Western Abyssinia.]—*Polichinico Sex Prat* 1940 Feb 19 Vol. 47 No. 7 pp 287-8 271-4 With 7 figs

The author writes of a number of diseases found in the region under consideration, mentioning particularly tuberculosis relapsing fever syphilis typhus, yaws and malaria. No new facts about these are given nor are any figures of the comparative frequency. He draws attention to a condition which he calls bilious haemoglobinuric fever which may be mistaken for yellow fever and quotes cases with a history of chronic malaria in which the symptoms were high fever shivering abdominal pain icterus, blackish vomit and haemoglobinuria. Quinine is useless. A diagnosis of yellow fever is not considered likely since the author claims that it usually exists in epidemic form. [But yellow fever and especially the jungle form, may occur in sporadic fashion. The frequency of *Aedes* in this district is not given and there is no record of pathological examination of the liver in these cases, nor of protection tests in the natives such as have been found positive in Malakal see this *Bulletin* 1939 Vol. 36, p. 633. Investigation appears to be called for.] C IV

ATKEY (O. F. H.) Distribution et incidence de l'*Aedes aegypti* au Soudan Anglo-Egyptien en 1939. [Distribution and Incidence of *Aedes aegypti* in the Anglo-Egyptian Sudan during 1939.]—*Bull. Office Internat. d'Hyg. Publique* 1939 Sept. Vol. 31 No. 9 pp 1588-1590

Details are given in tabular form of 5 467,553 examinations during which *Aedes aegypti* larvae have been found 125 times. It was found essential to have the identification made by an entomologist for out of 2,817 collections sent by local authorities as probably containing *A. aegypti* only 125 contained this species. In all cases adults were raised from the larvae before being forwarded to the central authorities.

The 125 positive collections included 1,861 specimens of *A. aegypti*. In addition 421 specimens of *Aedes tritaenatus* and two of *A. metallicus* from Khartoum have also been identified. E H

O BRIEN. Relevé de l'index larvaire annuel dans la Gold Coast pour l'année finissant le 31 décembre 1938. [A Statement of the Annual Larval Index in the Gold Coast for the Year ending 31st December 1938.]—*Bull. Office Internat. d'Hyg. Publique* 1939 Sept. Vol. 31 No. 9 p 1590

The larval index, or percentage of inspected localities in which mosquito larvae were found, of various centres in the Gold Coast is shown in the following table —

Centres with an Aerodrome

District	Locality	Larval index	Estimated population
Accra	Accra	0.17 p 100	74 937
Abanta Nima	Takoradi	0.22	5 478
	Sekondi	0.07	22,356

Important Centres without Aerodrome

District	Locality	Larval index	Estimated population
Eastern Province	Nsawam	0.43 p 100	10 868
	Koforidua	0.45	14 274
Central Province	Cape Coast	0.21	19 689
Wasaw (Western Province)	Tarkwa	0.34	33 792
Kumasi (Ashanti)	Kumasi	0.19	44 627
Eastern Dagomba (Northern Territories)	Tamale	0.59	19 495

E H

SENEVET (G) *Aedes aegypti* en Algérie [*Aedes aegypti* in Algeria]—*Arch Inst Pasteur d'Algérie* 1939 Dec Vol 17 No 4 pp 598-600 [11 refs.]

KENNEDY (J S) The Visual Responses of Flying Mosquitoes—*Proc Zool Soc London. A* 1940 Vol 109 Pt 4 pp 221-242

Mosquitoes flying against a wind maintain their direction by visual means

The author has carried out a series of ingenious experiments in the laboratory in order to analyse the responses of *Aedes aegypti* to visual stimuli during flight. Three main types of response are recognized. (i) In a horizontal beam of light this insect orientates consistently though not very accurately towards the darkness. (ii) It will orientate accurately towards a vertical black stripe on a white background, and will pursue such a stripe when rotated round it. A moving stripe of this kind is followed while similarly striped or quite dark walls are abandoned if these are stationary. (iii) If transverse stripes are moved along the floor of a tunnel in which the mosquito is flying freely it will fly in the direction in which the stripes are moving, often going faster than the stripes. If a current of air is passing through the tunnel and the stripes are stationary the mosquito will fly against the wind moving forwards over the stripes. But this orientation is completely lost in darkness—it is clearly a visual response—the insect avoids the passage of images over the retina from behind forwards. If the rate of air flow exceeds a certain value (150 cm/sec, 3.3 miles per hour) and the mosquito is unable to maintain its position relative to the ground it immediately alights.

If a mosquito is activated by the smell of a host carried down wind and the mosquito flies low this visual orientation will be effective

in guiding it to the host. But this orientating effect of wind will be lost if the insect flies a few metres above the ground. The author suggests that in the case of *Aedes aegypti* the attraction to moving objects and especially to dark moving objects ((i) and (ii) above) may be more important in the orientation of the insect to its host. On the other hand, the inability of this mosquito to fly except in gentle winds may be an important factor in confining the species to sheltered places.

I. B. Wigglesworth

WHITFIELD (F. G. Sarel). Air Transport, Insects and Disease.—*Bull. Ent. m. Res.* 1939 Nov. Vol. 30 Pt. 3 pp. 385-442. With 3 maps (1 folding). Bibliography.]

A useful summary of the subject which should be consulted in the original by those interested.

The increase of air transport and its potential dangers are discussed with special reference to malaria and yellow fever and in the case of the latter disease the literature and epidemiology are reviewed. The air communications of the world are shown, and also maps of Africa and South America showing air routes and yellow fever areas. The work done upon insects found in aircraft is reviewed and the results incorporated together with those from Khartoum. A comparison is made between insects found in the lower terrestrial zone of the atmosphere those found in the upper or "Plankton" zone and those found in the aircraft.

After a discussion of the economic significance of insects found in aircraft, the control of such insects is considered and suggestions made for future research.

E. H.

ATKIN (O. F. H.). Sur l'application au Soudan Anglo-Egyptien des dispositions de la convention sanitaire internationale pour la navigation aérienne en vue de la prévention de la fièvre jaune. The Application in the Anglo-Egyptian Sudan of the Provisions of the International Sanitary Convention for Aerial Navigation concerning the Prevention of Yellow Fever.—*Bull. Office Internat. d'Hyg. Publique* 1939 Sept. Vol. 31 No. 9 pp. 1585-1587.

Notes on the practical application of these provisions in the Sudan where there are various regular air services and in certain districts a high percentage of the natives give positive protection tests. However with the exception of one atypical liver from a case at Wau no positive liver has yet been found in the Sudan.

If the existence of yellow fever is suspected on clinical grounds the following measures are put into operation—

(a) Passengers are not allowed to embark in any suspected zone unless the airport is anti-malaria and is not suspect. Under these conditions passengers must remain six days under observation in the aerodrome limits before embarking and carry a certificate indicating the absence of any risk of contamination.

(b) Night stops are forbidden except in anti-malaria aerodromes, where the passengers and crew must remain on the aerodrome in places proved free from mosquitoes. Traffic is forbidden during the dark.

(c) Intensive measures are taken in order to eliminate *Aedes* from the suspected region.

If the case is not confirmed these restrictions are immediately withdrawn

Health certificates such as those issued in Nigeria are considered essential in the case of passengers coming from infected regions in order to avoid the necessity of keeping them under observation for six days

With regard to the mouse protection test it is pointed out that at Malakal where *Aedes* is practically non-existent and where no clinical case of yellow fever has ever been diagnosed the number of natives giving a positive mouse protection test has risen to 18 per cent in four years It is suggested that possibly the virus becomes attenuated in Africa in passing from the West to the East as a result of local factors and may ultimately cease to produce typical symptoms

Concerning anti-amaryl aerodromes the author states that they must be situated some distance from human habitations and in the Sudan one kilometre has been considered adequate A vigorous campaign must be maintained continually against *Aedes* El Obeid where these mosquitoes were abundant has been made practically free from them in the course of two years and in the Sudan generally *Aedes* has been either eliminated or reduced to negligible numbers at all airports of the international air routes

The experience in the Sudan shows that by the application of such measures there is no risk of any infected *Aedes* being carried in aircraft and the only possibility of the disease being spread is by contaminated persons during the incubation period This risk could be reduced to negligible proportions if adequate precautionary measures are taken immediately a suspected case is notified and if the passengers and crew coming from infected countries were provided by the sanitary authorities with medical certificates as to their freedom from infection

E H

LE VAN (James H) "E-Day" for Yellow Jack.—*Lehigh Alumni Bull* 1939 Nov Vol 27 No 1 pp 8-9 & 23 [Summary taken from *Public Health Engineering Abstr* Washington 1940 Feb Vol 20 No 2 p 11 Signed James H Le Van]

There is described the terror that spread when communities learned that yellow fever had struck in those days when neither the cause nor the mode of transmission of this disease was known In a list prepared by the U S Public Health Service of the 448 outbreaks in the United States in the period from 1868 to 1893 149 were marked as epidemics

The article continues by outlining the spread of jungle yellow fever in non mosquito areas in Brazil and Colombia and the relation of airplane traffic to the possible spread of yellow fever There follows the precautions exercised by the Public Health Service at the Miami airport quarantine station and the requirement that northbound planes be disinsected at Trinidad BWI just before taking off

The organization of the Public Health Service's motorized Aedes Aegypti Control Unit is mentioned and the results of the work of this mobile unit at Key West, Florida are summarized A detailed report on Key West is in the Surgeon General's Office listing the men, equipment and supplies that will be needed to bring the yellow fever mosquito population there under control quickly should Yellow Jack strike The city is laid out into districts with the number of men needed as inspectors the amount of oil larvicide and other supplies necessary the equipment of the

NIGERIA REPORT ON THE MEDICAL SERVICES FOR THE YEAR 1938
 [BRIERCLIFFE (R.) Director of Medical Services]—Yellow Fever
 p 12

The following is an extract from the Nigeria Report on Medical Services 1938 —

Yellow Fever Of the ten cases recorded in 1938 eight were Europeans and two Africans. Both of the latter proved fatal and of the former five died and three recovered. One of these cases, a European lady who recovered after a severe infection had been inoculated about four months before the onset. Her blood had not previously been tested for the presence of immune bodies but it is probable that only slight if any protection had resulted from inoculation. an exceptional occurrence met with in a small percentage of the one million cases inoculated in Brazil."

PENNA (H. A.) & MOUSSATCHÉ (H.) Modification of Yellow Fever Virus by Serial Passages in the Developing Chick Embryo.—*Brasil-Médico* 1939 Sept 16 Vol 53 No. 38, pp 904-905
 [Portuguese version pp 903-904]

A record of the passage in fowl embryos of a fully virulent yellow fever virus of the *Amis* strain.

The strain was still fully virulent after 19 passages after 29 passages vicerotropic properties had disappeared, but the strain showed a considerable amount of neurotropism which was greatly reduced in the 39th, 47th and 49th passages.

It is of interest that these modifications took place in the presence of the nervous tissues of the embryos and much quicker than the modification of the 17 D virus which was still fully neurotropic after 89 passages in cultures containing fowl embryos from which the central nervous system had been removed [see THEILER and SMITH this *Bulletin* 1937 Vol 34 p 680] E H

PENNA (H. A.) New Technique for Aseptic Removal of Chick Embryo from Egg.—*Anuário J. Trop. Med.* 1939 Nov Vol 19 No. 6 pp. 589-592. With 3 figs

The description of a method for sterilizing the egg-shell at the line of opening to allow the removal of the embryos infected with yellow fever virus, etc. without danger of bacterial contamination.

By means of a fine oxy-acetylene flame the egg-shell is burnt through the centre of the air sac and then the flame run round the shell above the margin of the air sac until the cap can be removed. The shell is a poor conductor of heat and therefore the amount of virus in embryos is unaffected. The great advantage of this technique is the elimination of the necessity for filtering the suspension of embryo in the preparation of vaccine since there is always a serious loss of virus during filtration. E H

BAUER (J. H.) Yellow Fever.—*Public Health Rep* 1940, Mar 1 Vol 55 No. 9 pp. 367-371

SAWYER (Wilbur A.) The Last Twelve Years of Yellow Fever Research.—*Puerto Rico Health Bulletin* 1939 Feb Vol. 3 No. 2, pp 39-44

PISTONE (Ferruccio) Progressi recenti nello studio della febbre gialla e loro importanza pratica. [Recent Advances in the Study of Yellow Fever]—*Riv di Biol Colon* Rome 1939 Dec. Vol. 2. No 6. pp 377-384 English summary (3 lines)

HEALTH Canberra 1939 Oct. Vol 17 No 10 pp 109-116—*Australia and Yellow Fever*

THE TYPHUS GROUP OF FEVERS

PRECIS OF ABSTRACTS IN THIS SECTION

General—The serological reactions of the various forms of typhus have been set out in tabular form by DE MAGALHÃES (p 562)

DAVIS (p 562) finds that *Rickettsia diaporica* found in ticks in Wyoming are identical with those from Montana. COX and BELL (p 562) have prepared practically pure cultures of *R. diaporica* suitable for agglutination tests. BURNET and FREEMAN (p 563) have confirmed the findings of DYER that *R. burneti* of Australian Q fever is identical with the *Rickettsia* recovered from ticks in Montana except that the latter is rather more virulent. *R. burneti* does not provoke agglutinins for strains of *Proteus* X.

MALBRANT (p 563) reports a disease of dogs in the Congo apparently caused by *Rickettsia* resembling *R. canis* except that they are pathogenic for guineapigs. MESNARD and TOUMANOFF (p. 564) have found *Rickettsia* pathogenic for guineapigs in ticks collected from a deer in Cochinchina.

Louse-borne—KUCZYŃSKI-GODARD (p. 564) describes micro-epidemics of typhus in the Peruvian highlands. In silent areas *Rickettsia* infected lice have been found on children though no cases of typhus have been seen but there is no evidence of *Rickettsia* other than those of typhus. It is thought that non immune people coming into contact with apparently healthy carriers of infected lice give origin to the micro-epidemics. BARLOVATZ (p 565) describes louse borne typhus in the forest region of the Congo giving clinical details. *Proteus* OX19 and OXA are agglutinated in high titre. Children are seldom ill and mild cases may be mistaken for influenza dengue or paratyphoid many of the natives appear to be immune. In the wards bed to bed infection is rare but most of the imported ward personnel were attacked.

DIGNAZIO *et al* (p 565) describe polyneuritis with permanent damage as a sequela of typhus in Abyssinia.

DANIELOPOLU and CRACIUN (p. 566) show that in severe cases of typhus there is an increase in the number of red blood cells, and a leucocytosis due to an increase in the mononuclear cells. Typhus nodules are caused by desquamation and multiplication due to the toxin of endothelial cells lining capillaries. Plasmacytes are seen in blood films and their presence is a point in differentiation from typhoid. DANIELOPOLU *et al* (p 567) again describe their findings. They consider that the nervous symptoms of typhus are not due to toxic action on the nervous system but to lesions in the capillaries of that system. The cerebrospinal fluid becomes yellow owing to the presence

in it of altered blood pigments. They discuss the differential diagnosis from typhoid and relapsing fever and the methods of prophylaxis, including vaccination, which should be employed.

RAYNAL (p. 569) restates his opinion that in Shanghai sporadic typhus is due to a murine virus transmitted, not in the usual way by fleas but by lice.

HILGERMAN (p. 569) suggests a further trial of the method of treating cases of typhus by means of vaccine of *Proteus* X19. LAIGRET and DURAND (p. 569) use white mice and a stabilized virus in tests of the neutralizing power of immune sera. In the *Archives de l'Institut Pasteur d'Algérie* (p. 566) it is suggested that persons bitten by lice in the course of duties in connexion with outbreaks of typhus should be given immediate intravenous injections of 10 cc. immune serum which is now available.

DE LA RIVIÈRE (p. 570) gives a clear account of preventive measures to be taken in connexion with louse-borne typhus. General measures consist of supervision of populations, their movements and their standards of personal cleanliness. The layout of special typhus hospitals is discussed, together with methods of delousing by disinfection and by close cutting of scalp and body hair. Louse-proof clothing for workers is referred to and mention is made of prophylactic vaccination. NICOLESCO (p. 571) discusses the protection of medical workers by means of louse-proof clothing and vaccination. MUELEN (p. 571) writes of preventive measures taken during the war of 1914-1918.

Flea-borne.—DYER (p. 571) suggests, as reasons for the spread of endemic typhus from the towns to the rural districts of eastern U.S.A. the mass rat migrations due to increased cultivation of food crops in place of cotton, and the fact that field mice have been found to be naturally infected.

BLANC and BALTAZARD (p. 572) show that there is no loss of virulence in murine virus preserved in the faeces of fleas so long as it is dry over a period of 631 days. This may explain much that is obscure in the carry-over of infection from season to season and country to country.

LILLIE *et al.* (p. 572) show that focal typhus nodes are produced in the brain of smaller rodents such as mice and rats by the virus of endemic typhus, but less constantly by that of Rocky Mountain fever. DURAND and SPARKOW (p. 572) show that white mice inoculated intranasally with murine or bostonneuse virus show enormous numbers of Rickettsia in the lungs. MACCHIARELLO (p. 573) describes the blood changes in white rats inoculated with murine typhus. Leucocytosis gives way to later moderate leucopenia with relative lymphocytosis and monocytosis.

BLANC and BALTAZARD (p. 573) lay down criteria required for the proof that a typhus virus is adapted to a particular insect host. They have found that the virus of epidemic typhus can satisfy these requirements in the flea *Xenopsylla cheopis* (and presumably therefore may be transmitted by this flea).

LORANDO and CARAMAOUNA (p. 574) report a case of phlebitis in murine typhus. PFEIFFER (p. 574) reports two cases of typhus in S. Africa which he regards as probably louse- and flea-borne respectively.

Flea-borne.—TRAVASSOS and DIAS (p. 574) have established the identity of the viruses of the spotted fever of Minas Geraes, São Paulo

and the Rocky Mountains. WELCH and JAKMAH (p 575) describe a case of Rocky Mountain fever

TOPPING (p 575) records a slight amount of success in the treatment of experimental Rocky Mountain fever with immune serum.

NOBÉCOURT and MARTIN LIPMAN (p 575) report a case of typhus resembling boutonneuse fever from the middle of France.

LE GAC (p 575) records a case of apparently tick borne typhus in Oubangui the patient's serum showed complete neutralizing power against Rocky Mountain virus and partial against boutonneuse virus

Mite-borne—LEWTHWAITE and SAVOOR (p 576) point out that tsutsugamushi rural typhus and scrub typhus are identical in all respects and that the supposed absence of primary sore in rural and scrub typhus is not enough to distinguish them since the primary sore may be so slight as to be missed or to have disappeared at the time of examination They therefore state that the name tsutsugamushi should be applied to all such fevers the names rural and scrub typhus being abandoned. KOTTER (p 577) however in describing the typhus found in N Sumatra states that the only difference between this and scrub typhus is the presence of a typical primary punched-out ulcer in the former The disease appears to be particularly prevalent in a certain area.

WEBSTER (p 577) reports further work on the *Proteus* 119 and 1A types of typhus in the Sumla hills. The virus of the former has been isolated from rats and of the latter from man Larval *Trombicula delhiensis* found on monkeys have not been proved to be infective nor have the monkeys tested been found positive to *Proteus* OXA

REYNES and RICHARD (p 578) describe a case of typhus of the *Proteus* OXA type with marked nervous symptoms. RIVOALEN *et al* (p 578) describe a case of typhus of the *Proteus* OXA type

Vaccination—MARIANI (p 578) points out that the non pathogenic *Rickettsia rocha-limas* is found in a large proportion of lice in Abyssinia. It occurs in the louse faeces and may give rise to error in the preparation of vaccine by Weigl's method, and it is possible that the theory of a rickettsial origin of trachoma may have arisen through overlooking this fact

DURAND and GIROUD (p 579) employ a vaccine prepared from emulsions of the lungs of guineapigs and rabbits infected by the nasal route with the virus of epidemic typhus suspended in 2 per cent formal saline centrifuged repeatedly and suspended in serum. Immunity conferred in animals depends more on the number of injections than on the size of the dose

ZIA *et al* (p 579) cultivate *Rickettsia* of epidemic typhus in sterile mouse embryo tissue in human serum Tyrode solution on agar The growths are killed by Merthiolate and carbolic and the vaccine thus prepared is non infective but can produce a positive Weil Felix reaction.

TCHANG and MATHEWS (p 579) show that inoculation of infected guineapig brain into the yolk sac of developing chick embryo gave better results than inoculation into the embryo itself ZINSTER *et al* (p 580) show that profuse growths of *Rickettsia* may be obtained by infecting minced chick tissue from egg yolk cultures and spreading the tissue over agar surfaces. COX and BELL (p. 580) report on the protection afforded to guineapigs after inoculation with the virus of epidemic and endemic typhus prepared from infected chick embryo

BLANC and BALTASARD (p. 550) show that vaccination with a living murine vaccine attenuated by treatment with bile in a single dose, produces solid and lasting immunity against murine and epidemic typhus. Flea excreta are dried and in this state the virus persists for at least two years. Treatment with bile, though attenuating the virus, does not alter its infectivity.

FINLAYSON and GROBLER (p. 581) find that guinea-pigs inoculated with killed Mexican murine virus are protected against the S. African epidemic strain. They also (p. 581) show that the viruses of S. African endemic and epidemic typhus are immunologically identical, but that they produce only inapparent infections in rats and mice. C IV

DE MAGALHÃES (Octavio). Typho exanthematico em Minas Geraes. Reacções sorológicas [Typhus in Minas Geraes. Serological Reactions].—*Brasil Medico* 1939 Mar 4 Vol. 63 No. 10 pp. 325-329. With 1 chart.

The chief value of this paper rests in a table of serological reactions with Proteins V_p , X_{20} , and XK in the various forms of typhus-like diseases, not only in Minas Geraes but also in Europe, the Rocky Mountain type, the Mexican, Australian, Malayan, Japanese and American. A similar table is now to be found in the text-books dealing with tropical medicine. H H S

DAVIS (Gordon E.) *Rickettsia diaporica*. Recovery of Three Strains from *Dermacentor andersoni* collected in Southeastern Wyoming: their Identity with Montana Strain 1.—*Public Health Rep* 1939 Dec. 15. Vol. 54 No. 50 pp. 2219-2227. With 4 figs.

Batches of ticks (*D. andersoni*) were collected in South Eastern Wyoming and injected into guinea-pigs. Three strains of a filter passing rickettsia-like organism were isolated from these ticks. The morphology and staining characteristics of these organisms, the reaction in guinea-pigs, experimental transmission by *D. andersoni* and cross immunity tests with the original Montana strain of *Rickettsia diaporica* all indicate that the three Wyoming strains and the Montana strain are identical [see this *Bulletin* 1940 Vol. 37 p. 254].

D Harvey

COX (Herald R.) & BRILL (E. John). The Cultivation of *Rickettsia diaporica* in Tissue Culture and in the Tissues of Developing Chick Embryos.—*Public Health Rep* 1939 Dec. 8. Vol. 54 No. 49 pp. 2171-2178.

The results of these experiments show that *R. diaporica* grows more readily in the yolk sac than in other tissues of the developing chick embryo or even in Marland cultures. Similar results were obtained previously with the *Rickettsia* of Rocky Mountain fever and of typhus fever but there was not so abundant growth of *Rickettsia* as in the present series of experiments. The nearest approach to the same abundance of culture was with the *Rickettsia* of Q fever of Australia. The authors have also found recently in the tissues and faeces of adult and nymphal *D. andersoni* ticks as great numbers of *Rickettsia* as in the yolk sac cultures. With these materials it has been possible to prepare practically pure cultures of *R. diaporica* suitable for agglutination tests. D H

BURNET (F. M.) & FREEMAN (Mavis) A Comparative Study of Rickettsial Strains from an Infection of Ticks in Montana (United States of America) and from "Q" Fever—*Med Jl Australia* 1939 Dec. 16 26th Year Vol. 2. No. 23 pp 887-891 With 3 figs [Summary appears also in *Bulletin of Hygiene*]

In previous papers Burnet and his colleagues described a new type of fever occurring in Queensland to which the provisional name of Q fever was given. Investigation showed that it was caused by a rickettsial type of organism (*Rickettsia burneti*) which did not provoke agglutination for *Proteus* strains which appeared to have its natural reservoir in a Queensland bandicoot (*Isodon ferox* Ramsay) and which appeared to be carried from one animal to another by the tick *Haemaphysalis humerosa*. A year or two previously (1935) a rickettsial organism was isolated from a batch of ticks in Montana. Study of this organism showed that it produced a febrile disease in guinea-pigs and was capable of giving rise to human infection in the laboratory. DYER in the United States observed complete cross-immunity between the Q and the Montana strains in guinea-pigs and found that the Q strain was agglutinated by the serum of the laboratory worker who had been infected with the Montana strain. The present authors have now compared in Australia the behaviour of the Montana and the Q strains. Both organisms were agglutinated to about the same titre by sera coming from a number of animals experimentally infected with one or other strain. Pathogenicity experiments showed that both organisms were infective to guinea-pigs mice and monkeys but that the Montana strain was undoubtedly the more virulent of the two. In guinea-pigs for example inoculated intraperitoneally the Montana strain gave rise to acute enlargement of the spleen with fibrinous exudate over the anterior pole while exudate was never seen in guinea-pigs infected with the Q strain. This greater virulence was also revealed in cultivation experiments on the chorio-allantois of the developing chick. The Q strain produced no lesions and survived for only a few passages while the Montana strain gave rise to a confluent mass of specific foci indistinguishable macroscopically from those caused by the psittacosis virus. Moreover infection was readily carried on by passage. There seems no question however of the essential similarity of the two strains and it is concluded that the Montana strain should be regarded as belonging to the same species as *Rickettsia burneti*. (See also this *Bulletin* 1938 Vol. 35 pp 62-64 835 1939 Vol. 36 p 479.] G. S. Wilson

MALBRANT (R.) Rickettsiose canine au Congo français. (Note préliminaire) [A Rickettsial Disease of Dogs in the French Congo] —*Bull Soc Path Exot* 1939 Dec 13 Vol. 32 No 10 pp. 908-913

A severe and often fatal disease of dogs in the Congo is described two types are noted the nervous and the typhus type. Rickettsia resembling *R. canis* of DONATIEU (N. Africa) were seen in films made from the blood and tissues of such animals. It was also possible to infect guinea-pigs which developed fever with loss of weight and orchitis. It is also stated that the virus in the blood of the guinea-pigs was filterable. *R. canis* (Donatien) is not pathogenic for guinea-pigs.

MIGNARD (Joseph) & TOUMAZOFF (Constantin) Agent infectieux du genre *Rickettsia*, mis en évidence chez une tique (*Haemaphysalis bispinosa* Neumann) du cerf de la Cochinchine. (Isolation of a *Rickettsia* Infective for *Quinsaspa* from a Tick (*Haemaphysalis bispinosa* Neumann) collected from a Sambar Deer in Cochin-China.)—*C. R. Acad. Sci.* 1940. Mar 4 Vol. 210 No. 10 pp. 378-380

Several ticks, *H. bispinosa* were collected from a deer killed in the forest land in Cochin-China. These were crushed and emulsified and injected into several guinea-pigs. One of these, a female reacted with fever and marked congestion of the vulva. This animal was killed and emulsion of the brain used to inoculate other animals, the virus has now been passaged 25 times with fever and orchitis in male animals. Typical *Rickettsia* were seen in films made from the tunica. D. H.

STANOW (Richard P.) The Charles Franklin Craig Lecture for 1938 Progress in the Study of Infections due to *Bartonella* and *Rickettsia*, with Special Reference to the Work performed at Harvard University.—*Amer. J. Trop. Med.* 1940, Jan Vol. 20 No. 1 pp. 15-44.

CARPANO (Matteo) Sul ciclo evolutivo delle *Rickettsie* (The Evolution of *Rickettsia*).—*Riv. di Parasit.* Rome, 1939 Dec Vol. 3 No. 4 pp. 283-303 With 12 figs. on 1 plate English summary (5 lines)

The author refers to his previous publication, about three years ago concerning the general morphology and of development and manner of reproduction of *Rickettsia* in particular to his studies on birds. He summarizes and illustrates in detail the general coloring cycle of such *Protista* which he had already clearly defined in his first publication.

FORRYE (Norman H.) The Preservation of the Infectious Agents of Some of the *Rickettsiae*.—*Public Health Rep.* 1940 Mar 29 Vol. 55 No. 13 pp. 545-547

This paper is reviewed in *Bulletin of Hygiene* 1940 Vol. 15 p. 323.

KOOSYMER-GODARD (Maxime H.) Una inspección preliminar de las zonas del tifo andino. (Preliminary Inspection of the Typhus Areas of the Andes).—Reprinted from *Reforma Méd.* Lima, 1940 15 pp. English summary

Discussing the ecological conditions in the Peruvian Highlands (9 to 13,000 feet) in relation to typhus fever a preliminary account is given of an investigation concerning lice especially collected from apparently healthy native children. Distinctions are made between silent areas and macro-epidemic outbreaks. These seem to be intimately correlated with special locally prevailing conditions. In silent areas *rickettsia*-infected lice have been met with although no cases of typhus could be noticed in the Indian population. There is no evidence of other *rickettsia* besides those connected with typhus-fever. Following the death of a Swiss workman the same phenomenon—*rickettsia*-infected lice carried by Indians without apparent diseases—was realized 18 days later. Children's infections are supposed to play an important part in the strange epidemiological picture. Non-immunized people coming into touch with the apparently healthy carriers of infected lice give origin to macro-epidemic

outbreaks. The paper is intended to prepare a more detailed investigation of this hygienically important situation rebuking unproved theoretical assumptions.

BARLOVATZ (A) *Typhus exanthématique de forêt au Congo* [Typhus in the Forest Region of the Congo]—*Ann Soc Belge de Méd Trop* 1940 Mar 31 Vol. 20 No 1 pp 23-40 With 1 fig & 5 charts [15 refs.]

The author's summary is as follows —

About 200 cases of spotted typhus are described for the first time in Belgian Congo as occurring in the tropical rain forest bordering the Congo river. The symptoms are set forth in detail and conform to classical standards peculiar features being a slow pulse rate slight or no involvement of the brain and no mortality in the series composed mainly of young Negro adults in good physical condition. The main signs were enlargement of the spleen albuminosis of cerebro-spinal fluid, slow pulse cylinders red and white blood corpuscles and albumen in the urine fever reaching at least once usually the very first days a high level and bronchitis. Several cases masqueraded as acute nephritis of unknown origin until Weil Felix reaction was found positive. The highest titre obtained was 1/12800 with Proteus O\19 O\K was agglutinated in somewhat lower concentrations than O\19 O\2 being usually negative. In a number of instances Weil Felix reaction was negative the first days of fever rose then steeply and subsided then slowly in about 3 months. It may be positive the second day of fever. Usually the highest titre is reached a few days after the fever has disappeared. Children are seldom ill, infants practically immune. Europeans may suffer. Many light cases resemble influenza until closely examined. Immunity seemed to be quite frequent among Negroes from the endemic area but all the imported personnel of the typhus wards went sooner or later down with typhus. This contrasts with the rarity of bed to bed infections which were quite exceptional, though many miscellaneous patients were imported too. The disease is transmitted by body lice. Incubation was in one instance 8 days in another one over 3 months. It is suggested that mild spotted typhus may be endemic in many places of tropical Africa camouflaging as flu, red fever dengue paratyphoid and so on and should be looked for closely.

GAUD (M) & POCOULE (A) *Quelques acquisitions récentes sur le typhus exanthématique* [Recent Advances in Typhus.]—*Bruxelles Méd* 1940 Apr 14 Vol. 20 Nn 24 pp 717-723

This is a review of recent advances in knowledge of typhus fevers with special reference to the big epidemic in Morocco in 1937-38.

D H

D'IGNAZIO (Camillo) LOMBARDI (Alfredo) & D'ARCANGELO (Domenico) *La polineurite nel tifo esantematico* [Polyneuritis in Exanthematic Typhus.]—*Arch Ital Sci Med Colon e Parassiti* 1939 Nov Vol. 20 No 11 pp 699-716 With 7 figs.

The authors give details of six patients in Abyssinia who developed polyneuritis after the defervescence of fever in typhus. All were Europeans. Symptoms commenced from 4 to 30 days after the end of the febrile period, increased slowly in severity and lasted one month or

longer. Cure was complete in one only but the outcome was fairly satisfactory in the remainder. The condition was apyrexial. Only the nerves of the extremities were affected and those of the arms were more severely attacked than those of the legs. Wasting of the muscles of the hands, hyperaesthesia or even hypoaesthesia with tenderness of the ulnar nerve (which was most commonly affected) were noted. The heat regulating mechanism was disturbed in three. There was paresis and failure of extension of the fourth and fifth fingers. The electrical reactions included the reaction of degeneration. There was hyperkeratosis and desquamation. The tendon reflexes were normal.

Treatment was experimental only. Vitamin B₁, liver extract and iodine preparations were given and the muscles treated with faradism.

C IV

DANIELOPOLI (D) & CRACIUN (E). Nouvelles recherches sur le sang dans le typhus exanthématique. Etude de l'hémogramme en fonction des lésions vasculo-conjonctives de tous les organes. [New Researches on the Blood in Typhus. Study of the Blood Picture with Reference to the Typhus Lesions in the Organs.]—*Bull Acad Méd. Roumanie* 1939 4th Year Vol 8, No 5-6, pp 457-478. With 4 coloured figs on 2 plates. [71 refs.]

The earlier work of one of the writers (D. Danielopolu) during the big epidemic of typhus in Rumania in 1918 is referred to. A very large number of cases was then observed and numerous blood counts were made. Slides from these patients have now been re-examined and some new cases followed up. The findings are as follows—

As regards the red cells little change was noted in the mild and medium cases but there was a considerable increase in the number of red cells in hypertoxic cases with collapse.

As regards the white cells there is occasionally a leucopenia in mild cases but usually a slight leucocytosis of 10 000 to 18 000. To observe this leucocytosis it is necessary to examine the blood from day to day as the increase in white cells may not be observed until the second week of fever. In cases of medium severity the count of white cells increases up to 20 000 per cmm. and in the hypertoxic cases still higher counts obtain. The authors insist that the leucocytosis is in uncomplicated cases of typhus due to an absolute increase of the mononuclear cells. Only in 5 per cent. of cases was there an increase in polynuclears without any increase in mononuclears. Also this mononucleosis is more frequent and more intense as the severity of the cases increases. The more severe the case the greater the leucocytosis.

As regards the typhus nodules in the smaller blood vessels in various organs these are due to a desquamation followed by multiplication of the endothelial cells lining the capillaries, this reaction is due directly to the effects of the typhus toxin which acts on endothelial tissues. In addition to the endothelial cells other cells are found in the lesions such as histiocytes, macrophages and tissue cells, these may be carried to the site of the lesion by the blood stream and may also be found in films made from the peripheral blood and thus the nature of the blood picture in typhus may be affected. Plasmocytes with deep basophilic cytoplasm and monocytes are also seen in blood films and the presence of the former is a diagnostic point in favour of typhus as against typhoid.

D E

DANIELOPOLU (M) LUPU (M) CRACIUN (E) & PETRISCO (M)
 Sur certains caractères épidémiologiques et anatomo-cliniques du typhus exanthématique. Typhus endémique et typhus épidémique de guerre Problème de la vaccination [Epidemiological and Clinical Characters of Typhus observed in the War of 1914-1918 The Problem of Vaccination]—*Bull Acad Méd* 1940 Jan 23 & 30 104th Year 3rd Ser Vol. 123 Nos 3 & 4 pp 56-69 With 4 figs.

— — — — — & — — — — — Sur les caractères principaux du typhus exanthématique de guerre et sur les associations de typhus et de typhoïde ainsi que de typhus et de fièvre récurrente. Nécessité de la vaccination antiexanthématique dans les circonstances actuelles.—*Bull Office Internat d Hyg Publique* 1940 Mar Vol 32 No 3 pp 300-341 With 21 figs. (15 on 8 plates) [22 refs]

These two papers contain much the same information and conclusions and are therefore abstracted together. The authors consider that to realize what typhus really is it is necessary to have seen and studied many cases during one of the great epidemics such as occurred during and after the war 1914-18 in Russia Rumania Serbia and Poland. It is possible that such opportunities may again arise in the near future. In addition to the study of typhus itself opportunity also arises to study mixed infections with relapsing fever and typhoid fever. Certain interesting epidemiological observations made in Rumania in 1917 in this connexion are referred to. In the winter when lice infestation was at its highest and people were crowded into insanitary houses epidemics of relapsing fever and typhus ran together and were equally prevalent. The number of cases of each disease was about the same yet the medical men and attendants on these people although they kept themselves free from lice contracted typhus but not relapsing fever. Several of these medical men stated that they were aware of being bitten by a single louse and developing typhus 8 days later. In the summer when infestation became much less in all people the epidemic of relapsing fever ceased but typhus cases continued to occur although much fewer in numbers.

The explanation of these facts as given by the authors is as follows. — In relapsing fever infection occurs by crushing of the lice thus setting free the virus which passes through pre-existing lesions in the skin caused by scratching. For this to succeed heavy louse infestation is necessary whereas in typhus the virus is found in the excreta of the louse and can be carried through the lesion made in the skin by the bite of the louse, pre-existing lesions are not necessary and cases have occurred where people have been infected by the bite of a single louse. This does not occur in relapsing fever.

During the epidemic in Rumania in 1917-18 the senior author (Danielopolu) observed over 400 cases of typhus and examined them from day to day. As regards the clinical picture he considers that in epidemics where the virus is rapidly and repeatedly passed from louse to man and man to louse the virus becomes as it were a fixed virus and the incubation period in all cases is 8 days and the fever lasts 15 days. There are three types of case the mild the severe and the hypertoxic, these last are typical and numerous and are rarely met with in sporadic cases at other times. A certain number of cases of

abortive fever (lasting less than 15 days) and inapparent cases also occur. Careful examinations were made of the blood of many patients and the results of these examinations are as follows.—The red cells were as a rule normal in number but in certain hypertoxic cases the blood is concentrated and the count may rise to 7 million or more per cmm. As regards the white cells there was a definite leucocytosis, which was due in 95 per cent. of cases to an increase in the mononuclear cells; this leucocytosis was slight in the mild cases more marked in the severe and hypertoxic cases. In these last if the count was over 20,000 and continued to increase after defervescence then the prognosis was bad and a fatal issue probable [a graph is included in the paper of a case in which in the apyrexial period the leucocytes numbered 72,000 shortly before death] especially if this is accompanied by cyanosis of the lower limbs and collapse with low blood pressure. The action of typhus toxin falls directly on the endothelial lining of the smaller blood vessels and capillaries of the organs of the body hence the typhus nodules and the presence in the blood picture of cells of endothelial origin and of plasma cells—a condition not met with in typhoid or relapsing fever.

In the opinion of the author the nervous symptoms met with in typhus, delirium, typhoid state, etc. are not due to direct action by the toxins on the nerve tissues but are due to the lesions formed in the capillaries of the nervous system by the action of the toxin. Also in typhus marked changes can be noted in the cerebrospinal fluid and these changes can be attributed to the same cause. In severe cases the fluid is tinged yellow and in hypertoxic cases may be the colour of urine and may coagulate when withdrawn; this yellow colour is due to altered blood pigments derived from destroyed red blood cells in the vessels in the brain. There is also an increase in the albumin content of the fluid and a marked cellular reaction; this was slight in mild cases, a few lymphocytes only, but in severe and hypertoxic cases many cells are present in the fluid, the majority of these are polymorphonuclear but plasmocytes and endothelial cells are also present; the condition is again of grave significance. As regards mixed infections of typhus and typhoid and relapsing fever the differential diagnosis is as follows.—The discovery of the parasite in the peripheral blood clinches the diagnosis so far as relapsing fever is concerned, but the patient may also have a typhus infection; the same applies to typhoid where the blood culture is positive yet typhus infection may also be present. The Weil-Felix reaction may help but may be delayed or not definite.

The diagnostic points to look for then as regards typhus are—Injection of conjunctivae and vasodilatation of face, leucocytosis over 20,000, presence of numerous plasmocytes and monocytes in the peripheral blood; this is not met with in typhoid or relapsing fever. The rash, the condition of the cerebrospinal fluid, yellow colour, increase of cells, coagulation, again not met with in the other two diseases.

As regards prophylaxis—delousing and bathing and clothing stations must be established, special loose-proof clothing for attendants provided. Vaccination is by means of a living attenuated murine virus. It should be noted that in Europeans this may give rise to severe reactions and infections.

RAYNAL (J) Le typhus murin à Chang Hai [Murine Typhus in Shanghai.]—*Bull Soc Path Exot* 1940 Mar 13 Vol 33 No 3 pp 168-175

This paper contains similar views to those expressed in previous papers by the same author and repeats that sporadic typhus in Shanghai is due to a murine virus but that the epidemic of 1938 was also caused by the same virus carried from man to man by lice.

An interesting finding arose from examination of rats from which a strain of virus was isolated in that no *Xenopsylla fleas* could be found on any of these rats. The fleas present were *Ctenocephalus musculi* and it was not found possible to isolate a virus from these fleas [see also this *Bulletin* 1940 Vol 37 p 256] D H

HILGERMANN (R) Behandlung und Schutzimpfung bei Fleckfieber mittels Proteus λ 19-Vakzine [Treatment of Typhus with Vaccine of Proteus λ 19]—*Dent Med Woch* 1939 Dec. 8 Vol 65 No 49 p 1774

This note is republished in view of the possibility of a recurrence of typhus fevers owing to the outbreak of war. The author refers to a note published in 1917 [HILGERMANN & ARNOLDI this *Bulletin* 1918 Vol. 12 p 99] in which is described a case of typhus fever successfully treated by means of vaccine of Proteus λ 19 he suggests that if cases are again met with the opportunity should be taken to give a further trial to this method. D H

LAIGRET (Jean) & DURAND (Roger) Sur une épreuve sérologique décelant les propriétés neutralisantes des sérums à l'égard du virus du typhus. [The Neutralizing Power of Sera against Typhus Virus.]—*C R Acad Sci* 1940 Jan 3 Vol 210 No 1 pp 67-68

Hitherto experiments for the demonstration of the neutralizing power of the sera of convalescents from typhus fever were carried out with guinea pigs rats or monkeys. These animals require large doses of virus to produce apparent infections. The authors find however that by employing white mice and a virus which has been stabilized by passage in these animals only a minute dose is required to produce infection and the neutralizing power of the sera can be easily and accurately demonstrated. D H

ARCHIVES DE L'INSTITUT PASTEUR D'ALGÉRIE 1939 Dec. Vol. 17 No 4 p 650—La prévention du typhus exanthématique par le sérum de convalescents [The Prevention of Typhus by the Serum of Convalescents.]

This is a pamphlet sent out by the Pasteur Institute of Algiers for the information of medical men and others engaged in dealing with outbreaks of typhus. It is suggested that if any such people are bitten by lice in the course of their duties they should at once be given an intravenous dose of 10 cc. of immune serum. The notice adds that serum is available at the Institute and would be despatched at once on receipt of telegram or telephone message. The immunity is immediate and lasts from 2 to 3 weeks [see also TOPPING below p 575] D H

DE LA RIVIERE (R. Dujarric) Prophylaxie du typhus exanthématique.
[Prophylaxis of Typhus].—*Mouvement Sanitaire* 1939 Dec.
vol. 18. No 187 pp 537-549 With 2 figs. [Summary appears
also in *Bulletin of Hygiene*]

Successful prophylaxis of typhus depends on accurate, early diagnosis and a logical application of knowledge of the mode of spread. The differential diagnosis is briefly discussed under the clinical and laboratory aspects. Human blood is infectious to lice from the fifth day to the crisis and the louse becomes infectious eight days after ingesting infected blood. The basis of prophylaxis is the destruction of lice on typhus patients, suspects and contacts. General hygiene measures consist in supervision of national and international movements of population and the housing of the poorer classes, and social general measures against parasitism as promotion of personal hygiene, frequent baths and changes of underclothing. Adequate diet and avoidance of fatigue and overcrowding are important also. Special hospitals for isolation of typhus patients should have the following components: (1) a building near the entrance for delousing all admissions, to contain closed receptacles for infected clothing, clean clothes and underclothing and an installation of baths and douches; (2) a medical examination room. Both (1) and (2) should be washed down daily with 5 per cent sodium carbonate solution and fumigated occasionally by sulphur; (3) Observation cubicle ward for suspect cases; (4) Wards for typhus cases and for negative cases; (5) Discharge block where recovered cases bathe and receive their disinfected clothing; (6) Disinfecting plant for dealing with ambulances stretchers, bedding and clothing. Alternative methods of disinfection are boiling in 5 per cent sodium carbonate solution high pressure steam current steam and sulphur fumigation. In default of these garments should be ironed giving special attention to folds and seams.

Delousing involves a close cut of the scalp axillary and pubic hairs, the cut hairs being collected in paper and the whole burnt afterwards. The scalp is treated with a benzene compress, the pubis with grey ointment and the eyelashes and eyebrows with yellow precipitate ointment. Hatching of ova should be watched for seven days later. The nursing and delousing staff should be chosen if possible, from those who have already had typhus and the whole staff should be isolated. Everyone working in the wards should wear a louse proof costume consisting of trousers en sac closed below the feet, sleeved blouse well fastened at the neck and wrists, a cap to cover the scalp ears and back of neck, and rubber gloves. A bath and change of underclothing are required daily.

Other measures comprise delousing of all inmates of the patient's house disinfection of their clothing and bedding, and sulphur fumigation of the premises. This should be extended to all contacts of the patients during the two days before the onset of symptoms. Children are in addition kept from school for 20 days. Sanitary authorities should supervise cheap clothing stores and homes for vagrants carrying out delousing and disinfection as required. Similar supervision and action should be undertaken at frontiers and ports.

The prophylactic value of typhus convalescent serum has been shown by Nicolle *et al* and the vaccines of Weigl and of Blanc have given good results (references given). Supplies of these should be obtained.

The relevant decrees of 8th July 1920 and 8th October 1927 are quoted together with the International Sanitary Convention for Air Navigation of 12th April 1933 in so far as it deals with typhus.

J W Healy

NICOLESKO (P) La prophylaxie du typhus exanthématique dans le corps médical [Prophylaxis against Typhus in the Medical Services.]—*Bull Acad Méd Roumanie* 1939 4th Year Vol 8 No 5-6 pp 513-515

The author strongly recommends the use of properly constructed and adjusted protective clothing for those employed in treating and dealing with typhus cases and their clothing and surroundings generally. He suggests some form of lightly made oilskin suit but whatever the material it must be louse proof—he is not yet convinced of the degree of protection to be given by vaccination but both methods should be combined.

D H

MÜHLENS (P) Fleckfieber und Rekurrenzgefahren und ihre Verhütung [Typhus Fever and Relapsing Fever and their Prevention.]—*Muench Med Woch* 1939 Oct 20 Vol 86 No 42. pp 1523-1526 With 2 figs

This paper the author states is written to help the younger medical men in Germany who have had no experience of typhus or other louse borne diseases in war time.

He gives an account of preventive measures against typhus in Bulgaria and Turkey during the war of 1914/18 and describes the usual precautions taken especially as regards lousing of cases contacts and troops generally along with their clothing and bedding. Illustrations of a Serbian barrel and a steam disinfecter of the Thresh type are given these both look very out of date.

A table is given showing the various types of typhus with the localities in which they occur and the vectors. Relapsing fever and trench fever are also briefly mentioned.

D H

MINISTRY OF HEALTH. Memorandum on the Louse and how to deal with it. Memo 230/Med. 12 pp 1940 London H.M.S.O. [2d]

DYER (R E) The Rickettsioses of North America.—*Trans & Studies of College of Physicians of Philadelphia* 1939 Dec. Vol 7 No 3 pp 232-259 With 4 charts & 2 maps.

This is the James M. Anders lecture delivered at the College of Physicians of Philadelphia in November last.

A general summary of the subject is given and it is emphasized that of the rickettsioses mentioned in the summary two are endemic in North America typhus and Rocky Mountain spotted fever. As regards epidemic typhus it is said that this form of typhus can be dismissed as the disease has never established itself in the country as a louse-borne disease. It is again emphasized that endemic typhus which at one time seemed to be limited to the towns along the Southern Atlantic coast has since 1932 spread more and more to rural areas. Two reasons are suggested for this spread (1) of recent years food crops have more and more taken the place of cotton and this has

3 There should be multiplication of the virus, not merely survival.

4 Above all the virus must be present in the dejecta, showing that the virus is adapted to the invertebrate host.

5 Survival of the virus in the dejecta—a test of virulence.

All these proofs have been established for murine typhus virus and the rat flea and also for the epidemic virus and the louse.

The authors have carried out a large series of experiments with the rat flea *Xenopsylla cheopis* and a virus of epidemic typhus and the same five proofs were definitely established. After a single feed on an infected animal the fleas became infected the infection remained in the insects throughout their lives and the virus multiplied in their gut. The dejecta of the fleas were infective and remained infective for at least 100 days. There was just as good adaptation of this virus to the fleas as there was of the murine virus, or of the epidemic virus to lice.

D H

LORANDO (N) & CARAMAOURA (Ph) Un cas de phlébite du membre inférieur au cours du typhus endémique. [A Case of Phlebitis of the Leg in Endemic Typhus].—*Bull Soc Path. Exot* 1940 Mar 13. Vol 33. No. 3 pp 143-148.

The authors point out that although phlebitis is fairly common in epidemic typhus and in boutonneuse fever it has only once been reported previously so far as they are aware to murine endemic typhus. In this paper they report a typical case which they have just encountered.

D H

PREIFFER (D H) Two Cases of Typhus Fever with High Agglutination Titres against X Kingsbury.—*South African Med J* 1940. Apr 13 Vol 14 No 7 pp 141-142.

Two cases are reported of sporadic typhus, both in cleanly people. No lice were detected in either and no other cases occurred at the time.

In the first case the Weil Felix reaction was positive for *Proctus* OVK 1/480 and negative for V19 and X8. This case on the laboratory evidence was diagnosed as possibly louse-borne typhus.

The second case which gave a Weil Felix reaction to *Proctus* OVK 1/320 OVK 1/120 and OVK 1/160 was diagnosed as probably rat flea typhus.

D H

DE MAGALHÃES (OCTAVIO) & MORAES (JOÃO AFFONSO) Typho exanthematico em Minas Geraes. Epidemiologia [The Epidemiology of Typhus in Minas Geraes].—*Brasil Med* 1939 Sept 9 Vol 53. No 37 pp 852-861 With 4 charts, 2 maps & 1 fig.

TRAVASSOS (J) & DIAS (EMMANUEL) Febre maculosa. Identidade imunológica dos vírus de Minas Geraes, São Paulo e das Montanhas Rochosas [Spotted Fever. Identity of the Viruses of the Minas Geraes, São Paulo and Rocky Mountain Types].—*Mem. Inst. Oswaldo Cruz* 1939 Vol 34 No. 2 pp 149-179 With 14 graphs. [11 refs.]

By an interesting series of carefully executed experiments, for details of which the original must be consulted, the authors have shown by cross-immunity tests, vaccination and other means the identity of the viruses of the spotted fever of Minas Geraes, São Paulo and the Rocky

Mountains. Their conclusions accord with the clinical pictures and the pathological anatomy insect transmission epidemiology and agglutination of *Proteus* of the three forms of rickettsial disease.

H H S

WELCH (Norman A) & JAKMAUH (Paul J) Rocky Mountain Spotted Fever A Case Report.—*New England Jl of Med* 1939 Dec 14 Vol 221 No 24 pp 937-939 With 2 figs.

A typical case of Rocky Mountain fever with profuse rash is described. This disease was contracted in Maryland on the Columbia border. The patient a woman stated that about 12 days before she fell ill she had removed and crushed ticks taken from a dog. This dog had recently been imported from Texas. Guinea-pigs inoculated with the blood of the patient developed fever and orchitis. The residual of the rash persisted for several months. Sulphanilamide was employed but had no effect on the fever.

D H

TOPPING (Norman H) Rocky Mountain Spotted Fever Treatment of Infected Laboratory Animals with Immune Rabbit Serum.—*Public Health Rep* 1940 Jan 12. Vol. 55 No 2. pp 41-48 With 2 charts.

The immune sera used in this series of experiments were obtained from rabbits which were injected with 2 cc. doses of Rocky Mountain fever vaccine twice a week for two weeks. Injections of living virulent tick virus were then given for some weeks. The animals were then bled.

Guinea-pigs were infected by means of virulent passage virus and were then treated with 5 cc. doses of the immune serum on the 1st and 2nd day of the fever. Of 12 treated 9 recovered and 3 died whereas of 13 controls, 12 died and only 1 recovered.

The rabbit serum was titrated against the plasma of infected guinea-pigs and was found to contain a large amount of protective antibodies. [See also p 569 above]

D H

NOBÉCOURT (P) & MARTIN LIPMAN, Mme Un cas de fièvre exanthématique [A Case of Typhus Fever].—*Bull Acad Méd* 1940 Jan 23 & 30 104th Year 3rd Ser Vol. 123 Nos. 3 & 4 pp 72-76

A case of fever in a boy of 10—sudden onset sore throat and a macular rash which appeared on the third day on face and chest and limbs but not the palms or soles. There was no primary ulcer. The fever lasted 8 to 10 days and the rash remained visible for three weeks. Polynuclear leucocytosis and positive Weil Felix reaction 1/200 for *Proteus OX19* were found. Clinically the disease resembled boutonneuse fever but was apparently contracted in la Nièvre in the middle of France. The vector is not known.

D H

LE GAC (P) Un cas de fièvre exanthématique observé chez un Européen résidant dans l'Oubangui. [A Case of Typhus Fever in a European in Oubangui].—*Bull Soc Path Exot* 1939 Dec. 13 Vol. 32 No 10 pp 902-906 With 4 figs.

A very severe case of fever with an extensive rash involving the face body and limbs including the palms and soles. A complication during the second week was violent delirium but the patient made a

good recovery no primary sore could be detected. The Weil-Felix reaction after the fever had ceased gave a positive reaction of 1/500 with *Proteus O\19* 1/1000 with *O\K* and 1/500 with *O\2*. Two guinea-pigs inoculated with blood taken during the fever both developed fever with orchitis and extreme wasting. Rickettsia bodies were seen in smears made from the swollen tunica tissue. The serum of the convalescent was tested for neutralizing power against the viruses of endemic typhus, boutonnense fever and Rocky Mountain fever the serum showed no neutralizing power against typhus, some slight action with boutonnense virus and complete against Rocky Mountain fever virus. Twenty days before he became ill the patient had been engaged in a shooting expedition and had camped in a native village where ticks were numerous. The author considers that this case was probably caused by the bite of a tick and resembled most nearly Rocky Mountain fever.

D H

LEWTHWAITE (R.) & SAVOOR (S. R.) Rickettsial Diseases of Malaya. Identity of Tsutsugamushi and Rural Typhus.—*Lancet* 1940 Feb 10 & 17 pp 255-259 305-311 With 7 figs. [31 refs]
LANCET 1940 Feb 17 p 319—The Rickettsias Simplified.

The object of this paper is twofold (a) to describe tsutsugamushi fever which although tropical is closely allied to diseases well known in non-tropical countries and (b) to try to eradicate the terms "rural typhus" and "scrub typhus." Most of the work referred to in this paper has already been published and summarized.

The main point of difference between tsutsugamushi and rural typhus is that in the one a primary sore is present in the other no such ulcer has been found. In all other points serological, clinical, immunological and epidemiological the diseases are identical. The authors point out that the primary sore often an insignificant and ephemeral pimple may be present only during the incubation period and may have disappeared before the patient is seen by a medical man. Perhaps the only evidence of the primary sore then remaining is enlargement of the lymphatic glands in the neighbourhood.

On one estate where numerous cases of "scrub typhus" and a few cases of tsutsugamushi had occurred it was found that in five of these cases in Europeans four showed primary sores and all were diagnosed as tsutsugamushi fever. Of 200 cases among the natives with whom these Europeans were working only two showed the primary sore otherwise the cases were identical clinically and strains of virus isolated from the two types of case were immunologically identical. Hitherto tsutsugamushi and the rural form of tropical typhus (scrub typhus) have been considered as separate diseases in virtue of the presence of a primary dermal lesion and attendant bubo in tsutsugamushi and their supposed absence in rural typhus. That is if a primary sore was found the case was diagnosed tsutsugamushi, if no sore was found it was diagnosed scrub typhus. The clinical picture, pathology and epidemiology are described and the results of experiments are recorded. From consideration of these especially of cross immunity tests between strains of the two clinical types, the conclusion is drawn that one and the same virus may cause various gradations of dermal lesions and that tsutsugamushi and rural typhus are identical. Rural typhus not being a disease *sui generis* this term should be discarded and the older term tsutsugamushi retained.

D H

KOTTER (G. F.) *Rickettsiosis onder de militairen in Atjeh* [*Rickettsiosis among Troops in Atjeh*].—*Geneesk Tijdschr v Nederl Indië* 1940 Jan 9 Vol. 80 No 2 pp 66-79 With 1 chart & 1 map

Tropical typhus still remains a problem in Atjeh ' situated at the northern extremity of Sumatra. It appears to take a major toll of sickness along with malaria of military garrisons in this region. A local name applied to the disease is *Seulimeum fever* and thus appears to cover the conditions Sumatra mite fever and scrub or rural tropical typhus. A table shows for 46 cases in all the detail of—primary lesion glandular swelling rash diazo reaction in the urine duration of fever blood picture agglutination of typhoid, para typhoid A and B *Proteus* OXA and OX19 incubation period. The last datum was obtained by assuming that infection had been contracted while parties of men were on patrol duty. One of the chief questions to be answered in this analysis was whether mite fever and scrub tropical typhus were two separate diseases. The sole distinguishing point seems to consist in the presence in the one case and absence in the other of a typical punched-out ulcer with necrotic centre which is the primary effect. A curious feature of the serum tests applied was that patients affected showed a high agglutination titre to one or other of the typhoid group organisms. This however was not really very extraordinary for all the men had undergone prophylactic vaccination. Absorption tests with one or other antigen typhoid or *Proteus* left the serum titre unchanged for the other antigen. The phenomenon therefore could certainly not be ascribed to co-agglutination of *Proteus* bacilli.

The local epidemiology of the disease was followed out by taking up the patrol regions and camping places one by one for each of the patients and thus investigation seemed to show that in the regions of Koetarodja and Seulimeum one sector in particular provided nearly all the cases. Prophylaxis was attempted for the military patrols by dusting the clothing with derris powder. The conclusions are come to that (1) there is no difference except for primary effect between Sumatra mite fever and scrub tropical typhus. (2) there is a definite territory in the north of Sumatra where the chance of infection is extremely high [see also LEWTHWAITE above].

W. F. Harvey

WEBSTER (W. J.) *Typhus in the Simla Hills. Part IX. Laboratory Observations chiefly on Human XK Strains*—*Indian J. Med. Res.* 1940 Jan Vol. 27 No 3 pp 657-666

This is a continuation report of the work that has now been going on in elucidating the problem of typhus in the Simla Hills and has a bearing on the general question of typhus in India and elsewhere. So far it has been possible to isolate the *Proteus* X19 typhus virus from rats caught locally and this continues to be so. Also from cases of local typhus fever only the XA virus has been isolated and this has been again repeated. It has not been possible to isolate an Y19 virus from any cases or XA virus from rats or from mites caught on these animals.

It has been found recently that the smaller types of local monkeys harbour large numbers of *Trombicula delhiensis* larval mites but so far it has not been possible to isolate any virus by inoculation of emulsions of these larval mites into guinea-pigs. Nor was it possible to isolate a

virus from the blood of the monkeys and the Weil-Felix reaction of their serum was also negative, nor could they be infected by injections of the human strain of *RR* virus.
D H

REYNES (N) & RICHARD (J) Sur un cas de typhus tropical à forme nerveuse [A Case of Tropical Typhus with Marked Nervous Symptoms].—*Bull. Soc. Path. Exot.* 1940. Feb. 14 Vol. 33. No 2 pp 70-73

This was a case of typhus in a European in Saigon in which the brunt of the attack fell on the cerebrospinal system. This attack was of short duration, some 3 or 4 days, there was loss of reflexes and paralysis of sphincters and incessant hiccup. The Weil-Felix reaction was positive to *Proteus OXA* and a typhus virus was isolated from the cerebrospinal fluid. The patient made a rapid and complete recovery.
D H

RIVOALEX BRUNEAU & KERNEVER. Typhus tropical mortel contracté dans le Haut Laos [A Fatal Case of Tropical Typhus contracted in the Haut-Laos District of French Indo-China].—*Rev. Méd. Française d'Extrême-Orient.* 1939 Dec. No 10 pp. 1125-1128.

A fatal case of typhus fever without any primary sore or rash but a positive Weil-Felix reaction for *Proteus OXA* 1/5000. There was violent delirium with loss of reflexes and incontinence of sphincters. The cerebrospinal fluid showed little change and there was a mononucleosis in the peripheral blood. Death occurred on the 14th day of fever preceded by symptoms of encephalitis.
D H

MARIANI (G) Caratteristiche del ceppo etiologico di *Rickettsia rockefelleri* [Characteristics of an Egyptian Strain of *Rickettsia rockefelleri*].—*Ann. d'Igiene* 1940 Feb Vol 50 No 2 pp 58-66 With 3 figs.

This species was recovered in one louse of 1,820 examined in Addis Ababa and in 30 per cent. of lice from the province of Gondar. The importance is not in the exactness of the figures but in the fact that *R. rockefelleri* is widespread on the Abyssinian highlands. Data from Europe and other parts are scanty and it may be that the determination of the species and characters of *Rickettsia* reported in association with, for instance, trachoma, has not been fully worked out and that *R. rockefelleri* itself non-pathogenic, may be found in connexion with and erroneously regarded as the cause of pathological conditions. It is further important in that it may cause confusion in the preparation of typhus vaccine by Weigl's method from louse intestine [see this *Bulletin*, 1938, Vol. 35, p. 783].

Details of the distribution in louse colonies are given. The *Rickettsia* are polymorphic, occur in clumps or chains, are only partially Gram-negative and occur in very large numbers in louse intestine and faeces. These characters should serve to differentiate them from *R. prowazeki* and *R. mooseri*. Experimental infection of laboratory animals gave consistently negative results. In two human experiments infection was also negative. Lice fed on infected animals showed no sign of infection. Inoculation with *R. rockefelleri* gave no protection against the pathogenic *Rickettsia*.

The natural infection of lice with *R. rocka-lissae* makes it imperative that research on the causation of disease or on the preparation of vaccines, in which lice are employed must be carefully controlled. The author refers to the possibility that CUÉNOT and NATAF [this *Bulletin* 1937 Vol 34 p 900] working on trachoma may have fallen into an error of this kind

C W

DURAND (Paul) & GIROUD (Paul) *Essais de vaccination contre le typhus historique au moyen de Rickettsias tuées par le formol (souches pulmonaires) [Attempts at Vaccination against Epidemic Typhus with Rickettsia killed by Formalin.]—C R Acad Sci* 1940 Mar 27 Vol. 210 No 13 pp 493-496

The method employed was to make emulsions of the lungs of guinea pigs and rabbits which had been infected by the nasal route with the virus of epidemic typhus these emulsions were suspended in 2 per cent formalin in normal saline and frequently centrifuged the *Rickettsia* were then suspended in human or horse serum with formalin

Series of guineapigs were inoculated with vaccine and later tested those series which had received repeated doses of vaccine were solidly immune The number of injections is of much more importance than the size of the dose. Monkeys also were protected and 12 volunteers were inoculated with 3 doses of vaccine without inconvenience In all cases positive Weil Felix reactions resulted after vaccination Also emulsions of *R. prowazeki* were agglutinated and neutralizing antibodies were demonstrated in the serum of the vaccinated people.

D H

ZIA (Samuel H) PANG (K H) & LIU (P Y) *Studies on Typhus Vaccine prepared from Agar-Tissue Culture.—Amer Jl Public Health* 1940 Jan. Vol 30 No. 1 pp 77-84 With 2 charts & 1 fig [15 refs]

The *Rickettsia* of epidemic typhus used in these experiments were grown in agar surface tube cultures the agar used was firmer than described in previous papers [ZINSSER FITZPATRICK and WEI this *Bulletin* 1939 Vol 36 p 1002] Human serum Tyrode solution was employed and sterile mouse embryo tissue. Heavy growths were obtained after 14 days incubation these were washed off and killed by addition of Merthiolate and carbolic This vaccine was found to be non infectious but capable of producing positive Weil Felix reactions in rabbits and in men Furthermore if given in sufficient amount it protected several series of guineapigs completely against subsequent infection

D H

TCHANG (J) & MATHEWS (G B) *Culture of Rickettsiae of the Chinese Typhus in the Yolk Sac of Developing Chick Embryo.—Chinese Med Jl* 1940 Jan Vol 57 No 1 pp 47-50

The inoculum 0.5 cc. of infected tissue emulsion was injected into the yolk sac just below the air sac and avoiding the embryo itself which must live for a further period of several days at least The eggs were then returned to the incubator

Results—The virus developed better in the yolk sac than in the embryo itself. The best results were obtained by inoculation of emulsion of brain of infected guinea-pigs—so numerous were the Rickettsia in the cultures that it is proposed to use this method for the preparation of vaccines. D H

ZIKSSER (Hans) PLOTZ (Harry) & ENDERS (John F.) *Mass Production of Vaccine against Typhus Fever of the European Type.*—*Science* 1940 Jan 12 Vol 91 No. 2350 pp. 51-52 [18 refs.]

An account is given of previous methods of preparation of vaccine against typhus.

The present method described by the authors is a mixture of culture obtained by direct inoculation of egg yolk sac and agar surface tissue culture on large surfaces. The inoculum is obtained from the egg yolk cultures and minced chick tissue is infected and spread over the agar surfaces by this means profuse growths of Rickettsia are produced. D H

COX (Herald R.) & BELL (E. John) *Epidemic and Endemic Typhus Protective Value for Guinea Pigs of Vaccines prepared from Infected Tissues of the Developing Chick Embryo.*—*Public Health Rep* 1940 Jan 19 Vol 55 No 3 pp 110-115.

Vaccines of typhus virus were prepared from the infected tissues of developing chick embryos in the manner already described by the authors for Rocky Mountain fever. It was found that most of the inoculated guinea-pigs were protected against epidemic typhus virus but the protection against endemic typhus virus was not so efficient although this endemic typhus vaccine did produce some active immunity. It was found possible to obtain 550 cc. of vaccine from two infected eggs when all the embryonic tissues were used [see also this *Bulletin* 1939 Vol 36, p 264 1940, Vol 37 p. 268] D H

BLANC (Georges) & BALTAZARD (Marcel) *La vaccination contre le typhus exanthématique par virus vivant. Son application au Maroc (Vaccination against Typhus with a Living Virus in Morocco).*—*Rev. d'Hyg. et de Méd. Préventive* 1939-1940. Vol 61 No 8. pp. 593-610. With 9 figs. [Bibliography]

The arguments for use of a living virus and against the use of killed virus are as follows. If killed vaccine is used it is necessary to give 3 or 4 doses of vaccine and this only produces a brief period of immunity whereas a single dose of living virus gives as good protection as does an attack of fever. So far there is no evidence whatever that murine typhus (the virus employed) is spread from the vaccinated people. The virus is so attenuated by treatment with bile that it produces only an inapparent attack in Moroccans with solid and lasting immunity not only to the virus employed in the vaccine and other strains of murine typhus virus but also to the epidemic virus. These facts have been proved by experiment in one case a man who had been vaccinated five years previously was found to be immune to injection of the epidemic virus. The present method of vaccine preparation is by the use of the dried excreta of infected fleas. Fleas are fed on infected white rats and the faeces are collected and dried in a vacuum.

the dried excreta are kept in this state until required for inoculation. The dose of vaccine is 1/100 milligram modified by the action of bile so that no apparent reaction results in man but if the same vaccine is inoculated intraperitoneally into guineapigs it produces fever and orchitis in these animals thus demonstrating that the infectivity has not been in any way altered by the action of the bile. As stated in the paper by Blanc above the infectivity of the virus persists in the dried material for at least two years and can be used during this period for preparation of vaccines.

D H

FINLAYSON (M H) & GROBLER (J M) A Study of South African Epidemic Typhus Strains and the Protection afforded by the Zinsser-Castaneda Vaccine against Infection with these Strains.—*South African Med J* 1940, Apr 13 Vol. 14 No 7 pp 129-134 With 1 chart [13 refs]

Two local strains of epidemic typhus virus were investigated and the results agree with those of other workers elsewhere. An interesting and important observation made was that guineapigs inoculated with a killed vaccine prepared in Mexico from a strain of murine typhus were protected against infective doses of the local epidemic virus. It is suggested that such a killed vaccine might be usefully employed in the protection of the large native population in South Africa among whom typhus fever is endemic.

D H

FINLAYSON (M H) & GROBLER (J M) A Study of Some Properties and Relationships of South African Murine Typhus Strains and the Protective Action of Zinsser-Castaneda Vaccine against South African Murine Typhus.—*South African Med J* 1940 Apr 13 Vol 14 No 7 pp 134-139 With 1 chart. [25 refs.]

Two strains of virus of murine typhus isolated from rats in the Cape Province were closely investigated and compared with two strains of the South African epidemic typhus virus. The authors agree with the opinion already expressed by GEAR that the viruses of endemic and epidemic typhus in South Africa are immunologically identical. But they also note that there are certain differences in the action of their murine viruses on experimental animals as compared with similar viruses in Europe and elsewhere thus the local virus produced only an inapparent infection in rats and in mice. A single dose of a vaccine prepared from a Mexican strain of murine virus protected 75 per cent. of guineapigs against the local immune virus and 3 doses of vaccine protected 100 per cent. of the animals thus showing a considerable immunological relationship between the two viruses.

D H

BRITISH MEDICAL JOURNAL, 1940 May 25 pp 855-856—Immunization against Typhus and Other Rickettsial Infections.

ANDRUZZI (R M A.) Storia, sviluppo e stato attuale della vaccinazione contro il tifo esantematico [The History Development and Present Position of Vaccination against Typhus]—*Ann di Med Nav e Colon* 1940 Jan-Feb. Vol 46 No 1-2, pp 47-65

BARTONELLOSIS AND OTHER FEVERS.

PRICES OF ABSTRACTS IN THIS SECTION

PATÍÑO CAMARGO (p. 582) gives an account of the Guátara outbreak of bartonellosis which caused heavy mortality in epidemic fashion in 1938. There was irregular fever with rheumatic pains followed by a verruga eruption appearing 30 to 60 days after the onset. Anaemia developed rapidly and *Bartonella* were present in the blood. Evidence seemed to point to the louse as the vector. Treatment with calcium, vitamins, arsenic and antimony gave excellent results. ORTEGA (p. 583) amplifies the clinical picture of this fever pointing out that the appearance of the verruga nodules is a favourable sign.

RIVALEN *et al* (p. 584) give an account of an outbreak of a five-day fever in Hanol. The temperature was of the saddle-back type and there was a strong mononuclear increase in the blood. It is thought that Psychodidae may have been the vectors. C IV

PATÍÑO CAMARGO (Luis) Bartonellosis en Colombia. Bartonellosis de Guátara o fiebre verrucosa del Guátara. [Bartonellosis in Colombia. Guátara Fever]—*Rev Facultad de Med Bogotá*, 1939 Apr Vol. 7 No. 10. pp. 467-501. With 14 figs. & 6 charts. [14 refs.]

Oroya fever and verruga peruana have been hitherto regarded as limited to certain valleys of the western slopes of the Andes, that is to Peru, Ecuador, Bolivia and Chile. In view of the facts recorded in this article we must revise or supplement our knowledge of the epidemiology of bartonellosis. The account has also some historical interest.

Early in 1936 the health authorities of Nariño were perturbed by an outbreak, with high fatality occurring in the watersheds of Juanambó and the Mayo river and suddenly invading Guátara. The disease was first thought to be malaria but quinine, even in large doses, proved ineffectual. In February 1938 Dr Augusto Gast of the Yellow Fever Service was sent down, there being a suspicion that the disease was of that nature. In the municipality of San José among a population of 8 095 there had been 80 deaths in 1936 194 in 1937 and in January 1938, 16 and in the first half of February 24. Forty samples of blood were taken but proved negative as regards yellow fever. Next came the announcement, in Ancuya in both urban and rural districts, is raging an epidemic resembling typhoid fever causing a high mortality. The disease in Samamego, Consacá and Sandomá is the same as this pestilence of Ancuya. At this stage the author was ordered to proceed to Nariño to determine the nature of the outbreak, to put in hand emergency measures in accordance with his diagnosis, and to prepare a scheme to combat it for consideration of the National Government.

The area involved was 50 by 20 kilometres and comprised 13 municipalities and about 100 000 total population. The outbreak started in the deeper cañons of the north-west and south-west of the volcano Dofa Juana, as stated above. From the very beginning the fatality was high settlements with an average in normal times of 8 deaths a month, now registered 64 in a single month. In the first nine months of 1938 there were 1,800 deaths from this cause and altogether the

victims were estimated to number over 4 000 in 1938 in Ancuya itself 466 died out of a total population of 6,846 or 6.5 per cent.

Clinically it differed somewhat from the classical description in which verruga is as it were a type of bartonellosis with very low fatality and Oroya fever the highly fatal febrile type. The Guátara fever was characterized by irregular and remittent fever at the beginning with rheumatic pains and anaemia followed by a verruga eruption. Symptoms in the stage of invasion were intense headache, and pain in back and limbs asthenia tachycardia praecordial pain dyspnoea and pallor. Often there were hyperaesthesia, sweats epistaxis and other haemorrhages, petechial and macular and albuminuria less common were cough vomiting diarrhoea and stupor. The eruption would appear at any time from 30 to 60 days after the fever and might be scarce or multiple discrete or confluent, on face and exposed parts, rarely on the mucosae. The lesions varied from milia in the skin to hard painless nodules in the subcutaneous tissue or even to tumours as large as a lemon which usually ulcerated later. The blood showed poikilocytosis with megalocytes and normoblasts the reduction of red cells might be rapid the counts on three successive days in one patient were 1 400 000 1 300 000 and 1 000 000 per cmm. Blood examination showed the presence of Bartonella. Medical treatment comprised removal to hospital and the giving of calcium vitamins [not specified] and small doses of organic arsenic and antimony with according to hospital records excellent results. No details of treatment are given.

Examination of lice from the patients and experiments on animals (*curi*, ? guineapig) seemed to point to the louse as the vector.

H H S

ORTEGA (Julio) Informe general sobre la campaña antiepidémica del distrito de Samaniego en el departamento de Nariño—*Rev de Higiene* Bogotá, 1939 Nov & Dec. Vol 20 Nos. 11 & 12. pp 49-62. With 5 figs. [La epidemia del Guátara [The Guátara Outbreak.] pp 54-62.]

The outbreak referred to here has already received notice in this *Bulletin* [1940 Vol. 37 p 271 and see preceding abstract] but this more recent account supplements the former and amplifies it in several particulars. Deaths resulting from it from June 1938 onwards were in successive months 4 8 9 7 15 16 37 and in the first four months of 1939 50 58 65 and 67 respectively. No age is exempt both sexes all races and persons of all economic and social states are attacked the valleys especially damp and marshy parts are commonly invaded. The following are given as characteristic symptoms [it will be seen that others are mentioned in the former account and some are given here which were not in the previous note] 1. Formication of spine and limbs, especially in fingers and toes furred moist and tremulous tongue heaviness of the eyes and pain in the neck praecordial pain at times acute headache and general pains enlargement of liver and spleen icteric tint in the conjunctivae pain and gurgling in the right iliac fossa general prostration drowsiness in some wakefulness in others and nightmares on dropping off to sleep marked feeling of anxiety fever of an undulant type with abrupt transitions ranging between 36° and 41°C. There are cold clammy sweats constipation changing in severe and fatal cases to uncontrollable diarrhoea a rash of purpuric

spots or of larger haemorrhages there may be a verruga-like condition in convalescence. This last is looked upon strange to say as of good prognosis so far no death has occurred among those presenting the "verruca type." In a few a tetanoid state recurs, with trismus and difficulty in swallowing these rarely recover.

The author concludes that the disease is autochthonous, that it is infective and probably transmitted by some blood-sucking insect all races ages and both sexes are susceptible, diagnosis is made on clinical and bacteriological grounds (Bartonella) the verruga form with cutaneous manifestations is benign. H H S

REAGLIATI (Raddi) Geografía de la enfermedad de Carrón. Verruga peruviana—Fiebre de la Oroya [The Distribution of Carrón's Disease.] —*Boletín Dirección de Salubridad Pública*. Lima 1938 pp 25-71 With 5 figs.

RIVALEN MARLINGS, MARTY & SAINT ETIENNE Notes sur une épidémie de fièvre des 5 jours observée à Hanoi au cours de l'été 1939 [Outbreak of a Five-Day Fever at Hanoi in 1939.] —*Mémoires de l'École Française d'Extrême-Orient* 1939 Vol 9 pp 1175-1177

In the latter half beginning of July to the end of November of 1939 the authors observed in various parts of the Tonkin delta—Harphong Nam-Dinh, Bac Ninh, etc.—an outbreak of fever characterized by malaise, fever, headache of sudden onset with temperatures 39° – 40°C sometimes with diarrhoea or obstinate vomiting and pain in the eyes without congestion. Each year a few such cases are seen, but this time the disease assumed epidemic proportions. Commonly the temperature would begin to drop on the third day run up again on the fifth day as a prelude to the final defervescence. On the fifth day often after defervescence an itching papular erythema might appear over the whole body but more marked on the limbs. The spleen would become palpable and the blood after an early relative polymorphonuclear showed strong mononuclear increase at expense of polymorphonuclears which fell to 24 per cent. the formula closely resembling that of infectious mononucleosis. There is no leucocytosis. Convalescence is rapid, weakness lasting for another 4-5 days only and relapse does not occur. From the time of year—that at which Phlebotomus is abundant—Psychodidae are suspected as vectors, but this needs further investigation. H H S

HELMINTHIASIS

PRECIS OF ABSTRACTS IN THIS SECTION

Cestodes.—BARNETT (p 588) gives figures of the incidence of hydatid disease in man, sheep and cattle in New Zealand. The majority of human infections are in the liver and lungs. SEXE (p 586) and BEATTIE (p 587) report on hydatid disease in Baghdad. RILEY (p 587) shows that wolves in the United States harbour *E. granulosus* and that the moose is an intermediate host. VEGHET RODRIGUEZ (p 587) found *E. granulosus* in 21.18 per cent of stray dogs in Santiago.

IVANISSEVICH (p 587) points out the importance of early diagnosis in hydatid disease of the lung and advocates X ray examination of all children and of all patients consulting doctors in the endemic areas of the Argentine. Operation should be performed early before the cyst has time to burst into a bronchus. ITURRASPE (p 588) discusses the condition in which after the emptying of a pulmonary hydatid cyst the true cyst wall of the parasite is not completely removed. This may lead to haemoptysis or periodic bronchorrhoea and there is a characteristic appearance on lateral X ray examination. Treatment is surgical removal but this is not justified unless the natural process is unsatisfactory as when septic fluid is retained. COSTA (p 588) reports two patients with pulmonary hydatid disease both of whom recovered after the cysts had burst into the air passages. CHOPRA *et al* (p 588) report on a case in India. CHIFFLET (p 589) shows that cysts in the upper and lower thirds of the abdomen may cause severe pressure symptoms while those in the mid zone do not. Post-operative suppuration may attack cysts remote from the site of operation and in multiple abdominal infection therefore the cysts of the upper and lower abdomen which are less accessible than those of the mid zone should be dealt with first. PIAGGIO-BLANCO and GARCIA CAFURRO (p 589) describe successful treatment of a pancreatic hydatid by marsupialization.

CASTEX *et al* (p 589) give a description of a case of hydatid disease of the kidney with marked Casoni reaction and eosinophilia of 3 per cent. McCLEMENTS (p 590) records hydatid of the kidney and pleura. PRAT and LOPEZ-GUTIERREZ (p 590) describe a hydatid cyst of the iliacus muscle treated by scraping. In hydatid disease of both bones of a knee joint LARGHERO-YBARRZ (p 590) considers that the infection spread from one bone to the other by the synovial membrane. TENHAEFF and FERWERDA (p 591) give the results of their attempts to induce experimental echinococcosis in white mice.

MENON and VELLATH (p 591) describe the tissue reaction round cysticerci in various organs including the brain.

Nematodes—TIMPANO (p 592) claims to have found *Necator americanus* on two occasions in Italy.

BRUNI (p 592) has found an active diffusion factor in *A. duodenale* ground in saline and concludes that hookworm anaemia is due to a parasitic toxin. HOFF and SHABY (p 592) report subacute combined degeneration of the cord caused by severe hookworm anaemia and successfully treated with iron liver extract and vitamin B₁.

In the plasma of patients with ankylostomiasis and oedema ZAINAL *et al* (p 592) found a definite decrease of albumin and an increase of globulin. There is therefore a reduction of the colloid osmotic pressure. The decrease of albumin may be due to shortage of protein in the food, and deficient absorption from the intestine may also play a part. OTTO (p 593) has found that the serum of dogs actively immunized by repeated infection contains an antibody of considerable potency against hookworm larvae and remarks that the same phenomenon must be considered in the study of human disease.

OTTO and LANDSBERG (p 593) conclude from experiments on dogs that in the treatment of hookworm anaemia a balanced and adequate diet is more important than iron therapy. In comment LANE points out the parts played by the intrinsic and extrinsic factors and by iron in the formation of erythrocytes. HADDAD (p 594) gives details of methods of treatment adopted in various worm infections. CAVALLEIRO

(p. 595) gives the results of a study of the pathological conditions induced in the liver of white rats by acute and chronic poisoning with carbon tetrachloride administered by inhalation and of the effect of injection of colchicine on this poisoning. The action of colchicine is to increase mitosis.

HARE (p. 596) gives the findings on which he bases his conclusion that the provision of family bore-hole latrines has reduced the incidence of hookworm infection in coolie lines in Assam. Remission still occurs but is probably acquired in fields and houses, and not in latrines, and will therefore gradually die out.

DUVOIR *et al.* (p. 596) treated a woman suffering from polycythaemia by infecting her with hookworms. A marked reduction of red cells was effected but was not maintained after expulsion of some of the worms.

C IV

MARIO ALOXSO (Luis) *Introducción al estudio de la equinococosis. (Biología y patología general)* (Introduction to the Study of Echinococcosis).—*Bol. Inst. Clin Quirúrg.* Buenos Aires. 1939 Vol. 15 No 129 PP 745-888 With 98 figs. [152 refs.]

This work was the thesis presented by the author for his doctorate. The preparation and writing of it occupied him for nearly three years. It deals with the biology and general pathology only and is very detailed and interestingly written and abundantly illustrated. It comprises an excellent account of practically all the known facts on the subject with which the author professes to deal, and due acknowledgment is given to writers of nationalities other than that of the author. The exposition is clear and the illustrations excellently reproduced. The author is to be congratulated on the outcome of his labours.

H H S

BARNETT (Louis) *The Incidence and Prevention of Hydatid Disease in New Zealand.*—*New Zealand Med J* 1939 Aug Vol. 33. No 206 PP 259-262.

In great part this is a report on hydatid infection in New Zealand during 1938, particularly as compared with 1937 (given in brackets).

In public hospitals there were treated 116 (128) the most notable differences being Palmerston North 1 (21) Timaru 1 (17) and Wellington (33). In private hospitals the figures were 28 (36). The prevalence of hydatid or tenuicollis cysts among the 31 million sheep and 4½ million cattle is great. I am well within the mark when I say that more than half of those that reach adult life have their livers and lungs studded with cysts of one or both sorts. The preventive campaign in dogs is by arecoline tablets. The newspapers have published adverse reports those of dog owners, farmers unions and veterinary officials have been almost universally favourable but it is evident that the instructions given with the drug are insufficiently clear.

The Hydatid Registry of the Royal Australian College of Surgeons which covers Australia and New Zealand shows for 1938 the number of reported infections as 1,304 and of deaths as 151 the largest figures being 787 liver cysts with 93 deaths and 260 lung cysts with 20 deaths but in many instances more than one part of the body is involved, liver

and peritoneal cavity and liver and lung being the commonest. It is pointed out how the better filing of index cards could improve the accuracy of returns
Clayton Lane

SENEKJI (H A) & BEATTIE (C P) The Incidence of Hydatid Disease in Iraq.—*Trans Roy Soc Trop Med & Hyg* 1940 Jan 29 Vol. 33 No 4 pp 461-462.

The percentage with hydatids of 34 146 persons admitted to the Royal Baghdad Hospital from 1935 to 1938 was 0.313 (1 in 319) of 2 347 sheep and goats slaughtered it was 11.93 of 223 cattle 24.66 and the infection was present in the one camel examined. The adult *Echinococcus granulosus* was found in 17.83 per cent. of 123 street dogs.

C L

RILEY (W A) Maintenance of Echinococcus in the United States.—*Jl Amer Vet Med Assoc* 1939 Vol. 95 pp 170-172. [16 refs.] [Summary taken from *Vet Bull* 1940 Mar Vol 10 No 3 pp 182-183 Signed D D OGILVIE]

Autopsy of a large number of wild mammals showed that the maintenance of hydatid infection of wild animals in the United States is in all probability due to the fact that wolves play the part of reservoir hosts. In the present study 5 out of 12 wolves examined harboured adult worms. The intermediate host of the parasite in many cases appears to be the moose and cysts were found in the lungs of 11 of the 21 of these animals which were examined.

NEGHEME RODRIGUEZ (Amador) La equinococosis y otros enteroparasitos de los perros vagos de Santiago [*Echinococcus* Infections and Other Intestinal Parasites of Stray Dogs in Santiago].—*Rev Chilena de Hig y Med Preventiva* 1937 Jan.-Dec. Vol. 1 No 1 pp 60-62.

Of 406 homeless dogs which were killed and examined in Santiago de Chile, 21.18 per cent. had *Echinococcus granulosus* in their intestines. The occasional parasite of man *Dipylidium caninum* was present in 56.06 per cent and *Dochmius canis* in 41.8 per cent. C L

IVANISSEVICH (Oscar) Tratamiento de los quistes hidatídicos del pulmón. [Treatment of Hydatid Cysts of the Lung].—*Bol Inst Clin Quirúrg* 1939 Vol. 15 No 128 pp 497-609 With 32 figs. [248 refs.]

This report on treatment of hydatid of the lung is accompanied by 93 case histories. It was delivered at the 10th Annual Congress of the Argentine Association of Surgery held at Buenos Aires in October 1938.

Surgical interference with hydatid of the lung should be early and complete. It should be early because, for example if the cyst empties itself through the bronchi bronchial epithelium grows down and lines the cyst with the formation of a permanent cavity. To avoid this and other complications by early diagnosis recourse should be had to X rays used on all children and on all patients who consult a doctor in endemic areas for these make evident all cysts with a diameter of over 5 centimetres. That is the time to operate. There is detailed

a consideration of the different conditions which may be found at, and of the means that make for success in operation pneumothorax, shutting off of the pleura its drainage raised air tension in the bronchi, complete evacuation of the parasite closure of the lung cavity done rightly or wrongly its marsupialization, and even lobectomy

C L.

ITURRASPE (Miguel Correa) Quistes hidatídicos del pulmón. Membrana encarcelada [Hydatid Cyst of the Lung. Retention of Membrane after Expulsion of the Contents].—*Bol Inst Clin. Quirón* 1939 Vol. 15 No. 123 pp 643-697 With 14 figs. 28 ref

The author is dealing with 24 instances in which after the emptying of a hydatid cyst of the lung the true cyst wall of the parasite itself was not completely removed was retained as the placenta may be retained

The frequency of this condition is put as 20 per cent. of hydatid cysts of the lung observed by X-rays. It may occur when a cyst opens into the air passage or when a surgical operation has failed to get rid of the whole of the parasite. That after rupture, the parasite degenerates has not been fully demonstrated when some of the cyst is retained in the lung the essential symptoms are haemoptysis or periodic bronchorrhoea or both but it is on the X-ray picture that stress is here laid. The exposure must be made laterally not antero-posteriorly and its value depends on the fact that the branches of the bronchial tree as so viewed, are spread out over the cyst, that when this bursts and the lung shrinks these structures do not share in the collapse of the cavity this accordingly takes on a polygonal outline (when seen laterally) the bronchial branches lying at the angles, and that outline is made evident on the plate by the shadow of the relatively opaque wall of the crumpled cyst. The treatment is the removal of the dead cyst either naturally or surgically but surgical interference is not justified unless the natural process is unsatisfactory as for example when there is retention of septic fluid

C L.

COSTA (Alberto) O quisto hidático do pulmão e a técnica curativa. Spontaneous Cure of Pulmonary Hydatids by Expectoration of their Contents.—*África Med* Lisbon 1939 Oct. Vol. 5. No. 10. pp 201-214 With 5 figs

Two cases are reported in which hydatid cysts burst into the air passages and the contents were expectorated. Both recovered, with fall of eosinophils from 12.9 to 3.9 and from 37.3 to 3.5 per cent.

C L.

CHOPRA (R. N.) PASKICHA (C. L.) & LAL (S.) Hydatid Disease of the Lung. A Case Report.—*Indian Med. Gaz* 1939 Oct. Vol. 74 No. 10 pp 81-822 With 1 fig

In view of the fact that only two cases of hydatid of the lung have been reported in India the authors note that 10 years ago a patient now seen by them had a diagnosis of this condition. An X-ray photograph now taken shows a denser and slightly larger shadow than that of 10 years back. The Cassou intradermal reaction was well marked. Eosinophilia was 3 per cent.

C L.

CHIFFLET (Abel) Tática operatoria en la equinococosis peritoneal múltiple [Surgical Technique in Multiple Hydatid Cysts of the Peritoneum.]—*Arch Uruguayos de Med Cirug y Especialidades* 1939 Sept. Vol. 15 No 3 pp 211-221 With 4 figs

From the surgical viewpoint the abdomen so far as concerns multiple peritoneal hydatid cysts falls into 3 zones. The mesoabdominal zone lies below the mesocolon and above the pelvis and in it cysts, by reason of the slightness of the reaction round them are easily ruptured by accident or even by a surgeon's too firm palpation and do not produce pressure symptoms on rupture into organs. On the other hand, cysts in the thoracico-abdominal zone may produce grave insufficiency of the liver and ulceration of surroundings with intrapleural rupture while pelvic cysts may cause compression of the pelvic organs.

In surgical treatment suppuration is the matter which needs to be first in mind. If a cyst is suppurating it is that cyst that needs immediate operation. But apart from this post-operative suppuration about cysts remote from the site of operation and showing itself 6 to 10 days later as an inflammation caused by circulating bacteria, must be in mind and if the cysts so attacked are in the upper or lower abdominal zones they are more serious and less open to surgery than if they had been earlier dealt with. Accordingly it is cysts in these parts which should first be treated by the surgeon when the hydatid infection is by multiple abdominal cysts. C L

PIAGGIO-BLANCO (Raúl A.) & GARCIA-CAPURRO (Federico) Quiste hidatídico de la cabeza del páncreas. Importancia de la radiología para su diagnóstico [Hydatid Cyst of Head of Pancreas. The Importance of X-Rays in its Diagnosis.]—*Arch Uruguayos de Med Cirug y Especialidades* 1939 Sept Vol 15 No 3 pp 245-251 With 4 figs

A lad of 17 had a circumscribed tumor below the right costal margin with vomiting some jaundice deeply coloured urine and lightly coloured faeces. X ray plates showed gastric dilation. Operation allowed of the successful treatment of this pancreatic cyst by marsupialization. C L

CASTEX (Mariano R.) MAGGI (Alberto) & OROSICO (German) Hidatidosis renal y pararenal. [Renal and Pararenal Hydatid Cysts.]—*Prensa Méd Argentina* 1940 Feb 7 Vol. 27 No 6 pp 283-294 With 4 figs. [73 refs.]

The hydatid cysts complicated diabetes. A man of 34 had lumbar pain for six months and on admission to hospital had an enlarged abdomen and glycosuria of 27.5 per thousand. A month before admission he had begun to pass hydatid material without pain but with a feeling of urethral obstruction. Sixteen days later there was haematuria with colicky pain and expulsion of cysts and on admission a large tumour about the left kidney passage of membrane vesicles and hooks through the left ureter with diminished quantity of fluid and of urea passing through that ureter. The Casoni reaction was marked and there was eosinophilia of 3 per cent. among white cells numbering 10,000. X rays showed a cyst in the upper part of the left kidney and another smaller one above this beside the spinal column. C L.

MCCLEMENTS (S) A Case of Hydatid Disease. [Memoranda.]—*Brit. Med. J.* 1939 Dec. 9 p 1140

During life a man of 72 who had been in poor health on and off for over 30 years, passed in the urine a hydatid cyst with scolices and hooklets. The left kidney was replaced by a large number of hydatid cysts about the size of marbles," as was revealed on his death and like material was then found in a left pleural effusion. C L.

PRAT (D) & LOPEZ-GUTIERREZ (J C.) Hidatidosis primitiva de la logia del psoas ilíaco derecho (Quiste hidático del psoas ilíaco.) [Primary Hydatid Cyst of the Right Iliac-Psoas Muscle.]—*Arch. Uruguayos de Med. Ciruj. y Especialidades*. 1939 June. Vol 14 No 6 pp. 576-585 With 1 fig [11 refs]

Professor DÉVÉ has told the authors that a hydatid cyst of this region is not so rare as they thought but that this is a new observation inasmuch as it was treated as such.

The swelling in the right iliac fossa was by its resistance the mobility of the spinal column and by being palpable per rectum suspected of being hydatid. An incision outside the right rectus and reflection of the peritoneum displayed the iliacus muscle. After protection by cloths the cyst was opened through this and the cavity scraped. Fluid and membrane escaped. C L.

LARGHERO-YBARRZ (P) Patogenia de la hidatidosis bi-epifisaria de las articulaciones (Intervención de los ligamentos intra-articulares) Los ligamentos cruzados como vía de propagación de la infección parasitaria de una epífisis a la otra de la articulación de la rodilla [The Pathogeny of Hydatid Infection of Both Epiphyses of a Joint.]—*Arch. Uruguayos de Med., Ciruj. y Especialidades* 1939 Dec Vol 15 No. 6. pp. 545-617 With 2 protocols & 59 figs.

In a knee joint there was hydatid infection of both femur and tibia that in the former being held to be the older. Professor IVANISOVICH has had a similar case of infection of both these bones. The method of infection is discussed. It is concluded that simultaneous infections by two blood-borne embryos is unlikely and that spread from one bone to the other was not along the crucial ligaments but by the synovial membrane. The view is based on the findings illustrated in the profuse and clear photographs which accompany the paper. C L.

CHANDRA (Hukam) A Hydatid Cyst in the Neck.—*Indian Med. Gaz.* 1940 Feb Vol 75 No 2. pp 95-96

One large and two small hydatid cyst identified by hooklets when excised, are reported in the left side of the neck of a boy of six.

C L.

CAMALER (Armando F) Consideraciones sobre cinco casos personales de equinococos raquídeos (Five Cases of Spinal Hydatid. —*Revista Méd. Argentina*. 1939 Dec 20 Vol 23. No 51 pp 2482-2487 With 6 figs

RUBENI (Renato) Sulla possibilità di un viraggio della reazione di Casani dopo intradermoreazioni ripetute. [The Possibility of Changes in the Casani Reaction as a Result of Repeated Intradermal Tests.]—*Policlinico Sez Prat.* 1939 Oct. 23 Vol. 48 No 43 pp. 1859-62 1865-7 [17 refs]

TENHAEFT (C) & TERWERDA (S) Experimenteele echinococcose [Experimental Echinococcosis.]—*Tijdschr v Diergeneesk* 1940 Feb 1 Vol 67 No 3 pp 124-131 With 5 figs on 3 plates. English summary

In imitation of Prof DÉVÉ of Ronen and the Belgian workers DE WAELE and DE COOMAN the authors also tried to evoke echinococcosis experimentally. As experimental animal they used white mice in which they injected (according to the prescription of DÉVÉ) intraperitoneally the solid parts from the *Echinococcus* cysts (*Echinococcus*-sand). The percentage of positive results so obtained was considerably smaller than the percentage obtained by the investigators mentioned above.

The authors give as their opinion that the principal cause of this difference is the fact that they used sand from old cysts the scolices of which were dried or had only a small vitality.

The favourable results of meat inspection by which the percentage of *Echinococcus* in slaughter animals decreased and the number of new infections therefore was less frequent were the cause of the less favourable results of this research.

The symptomatology and the pathological anatomical picture of the positive cases corresponds with those described by DÉVÉ.

A therapy with dobyfrol in order to obtain a calcification of the cysts had no results.

GORDON (Hugh McL.) The Occurrence of *Diphyllbothrium latum* the Broad Fish Tapeworm, in Dogs in Australia—*Australian J et JI* 1939 Dec Vol. 15 No 6 p 256

MENON (T Bhaskara) & VELIATH (G D) Tissue Reactions to *Cysticercus cellulosae* in Man.—*Trans Roy Soc Trop Med & Hyg* 1940 Mar 20 Vol 33 No 5 pp 537-544 With 12 figs. on 4 plates. [14 refs]

A study on three autopsies made in Madras and Vazagapatam (South India) on those dying of cysticercus infection. All showed infection of the brain and one of heart diaphragmatic pectoral and intercostal muscles with fatty degeneration of liver and kidneys.

It is demonstrated that the nature of the tissue reaction is similar in the brain and the other organs and consists in the formation of a capsule of mesenchymal tissue with an inner necrotic zone a middle fibrous and plasmacytic zone and an outer zone of granulation tissue. With the gradual absorption of the dead parasite the reaction becomes more marked and ultimately a fibrous scar is formed especially in the brain. Calcification of cerebral cysts is not very common.

In the brain this mesenchymal capsule is surrounded by an area of gliosis where the nerve cells have undergone degeneration.

The formation of multiple scars in the brain and the overlying meninges is put forward as the main pathological basis of the nervous symptoms.

TIMPANO (P) Lanchilostomiasi. (Rilevi clinici e di laboratorio) [Ankylostomiasis Clinical and Laboratory Findings].—*Polidisco. Sez. Prat.* 1939 Aug 14 Vol. 48. No. 33 pp. 1455-1461

Remarks based on experience with 1165 cases. Most of what is noted here is part of the common knowledge of the infection. An unexpected statement is that in direct examination of faeces for infection enough must be taken to detect eggs or larvae of the worm. In answer to his own question whether *A. americanus* exists in Italy the author reports finding it on two occasions. C. L.

BRUNI (Augusto) Il fattore di diffusione nell'ankylostoma duodenale. [The Factor of Diffusion in *A. duodenale*].—*Settimana Med.* Palermo (formerly *Riv. Sanitaria Siciliana*) 1939. Sept. 14 Vol. 27 No. 37 pp. 1105-1106.

There exists in *A. duodenale* an active diffusion factor

These parasites were obtained by anthelmintic from man, the worms picked from the fresh stool, washed in normal saline, soaked for some hours in 0.5 per cent phenol in normal saline thoroughly washed in normal saline ground up in normal saline, the suspension centrifuged and the supernatant fluid injected under the skin of albino rabbits. When this fluid was first mixed with Chinese ink or with diphtheria toxin the evidence of diffusion was considerably greater than when these substances were injected after mixing with the same quantity of normal saline. It is concluded that hookworm anaemia is not due to loss of blood but to a toxin in the parasite. [For evidence of loss of blood see FILLBORY and KENTH this Bulletin 1931 Vol. 28, p. 234 WELLS 1932, Vol. 29 p. 421] C. L.

ROGERS (W. P) The Physiological Aging of Ankylostome Larvae.—*Jl Histo-ology* 1939 Dec Vol. 17 No. 4 pp. 195-202. With 2 figs & 2 graphs.

HOFF (Hans) & SRANA (J. A) Nervous Complications in Ankylostomiasis.—*Jl Trop Med & Hyg* 1939 Dec 1 Vol. 42 No. 23. pp. 360-362

Three cases of subacute combined degeneration of the cord caused by severe secondary anaemia due to infestation with *Ankylostoma duodenale* have been described.

Treatment was given successfully by a combination of iron, liver extract and vitamin B₁₂ and later the *Ankylostoma* removed.

ZAINAL, STREEF (G. M.) & STREEF SPAAN (A. V.) Eiwitspectrum en oedeem bij de ankylostomiasis. [The Relation of Albumin to Hookworm Oedema].—*Geneesk Tijdschr v Nederl Indië* 1940. Jan 2 Vol. 80 No. 1 pp. 3-22 [23 refs.] English summary

The investigation of the protein fractions in the plasma and oedema of patients with ankylostomiasis has taught us the following —

1. The total percentage of plasma protein was found to be distinctly decreased with the greater part of the 29 patients.

* The concentration of albumin proved to be distinctly lowered in the greater part of the cases. This decrease was found with all oedematous patients.

3 The globulin fraction showed a distinct increase with the greater part of the patients. This is especially the case with oedematous patients

4 The reduction of the total percentage of protein was exclusively attributed to the decrease of the concentration of albumin

5 The percentage of fibrinogen was found to be normal with nearly all patients, either with or without oedema.

6 The albumin globulin quotient was found to be distinctly decreased in by far the greater part of the cases. This was especially applicable to persons with oedema. Further nearly all oedematous patients had a quotient smaller than one. With these persons therefore a total reversion of the ratio took place.

7 The percentage of non protein nitrogen was found to be normal with the greater part of the patients

8 The oncotic pressure proved to be distinctly decreased with by far the greater part of the patients examined. This decrease occurred with all oedematous patients, with whom as a rule the pressure was also lower than the critical value of 30 cm. water

9 It was supposed that the oedema with the ankylostomiasis patients examined was caused by a reduction of the colloid-osmotic pressure, which decrease was brought about by a decrease of the percentage of albumin

10 Finally the possibility was suggested that the decrease of the albumin fraction with the ankylostomiasis patients examined was the consequence of a shortage of protein in the food, while an insufficient absorption of this from the intestines might play a part as well.

Conclusion.

With reference to the cause of the oedemata in case of ankylostomiasis we conclude that these oedemata are the consequence of an obvious decrease of the albumin fraction of the plasma with its attendant decrease of the colloid-osmotic or oncotic pressure.

OTTO (G F) A Serum Antibody in Dogs actively immunized against the Hookworm, *Ancylostoma caninum*.—*Amer J Hyg* 1940 Mar Vol 31 No 2 Sect D pp 23-27

Experiments appear to demonstrate that the serum of dogs actively immunized by repeated infection contains an antibody of considerable potency against the hookworm larvae. The phenomenon seems to be essentially the same as that reported by Sarles in his studies on *Nippostrongylus brasiliensis*. These experiments do add more specific substance to the already available evidence that the phenomenon of specific acquired immunity plays an active rôle in the host control of canine hookworm infection. Furthermore they add to the rapidly accumulating evidence that consideration must be given to this same phenomenon in our study of human hookworm disease.

SHUTE (D S) Ankylostomiasis—a Misleading Case.—*Jl Roy Nav Med Serv* 1939 Oct. Vol 25 No 4 pp 422-423 With 1 chart.

OTTO (G F) & LANDSBERG (J W) Dietary Deficiencies and Iron Salts in Hookworm Infections.—*Amer J Hyg* 1940 Mar Vol 31 No 2. Sect. D pp 37-47 With 1 graph. [18 refs.]

In two experiments involving seventeen dogs large amounts of iron were added to the diet of seven of the fifteen animals maintained on a

f. The changes observed in the parathyroid, suprarenal, hypophysis and islands of Langerhans seem to have no special bearing on helminthological medicine
C L.

HARE (K. P.) An Experiment in Cooche Line Sanitation. Effect on Hookworm Incidence.—*Indian Med Gaz.* 1940 Feb. Vol. 75 No. 2. pp. 86-88.

The author has previously described the installation of a bore-hole latrine one for each family in the cooche lines of an estate in Assam (this *Bulletin* 1939 Vol. 36 p. 508). These have proved so successful that several hundreds are now in existence in the neighbourhood. To assess their value in the prevention of hookworm disease he has made stool surveys and has employed as a control another cooche line. The technique of the stool surveys was the same in all cases. In the control line the infection rates in March 1938, November 1938 and March 1939 were 88.6 83.2 and 84.7 per cent. in the line supplied with latrines they were in November 1938 and March 1939 81.7 and 73.3 per cent. and the impression from stool examinations was that the infections in this line had become much lighter. Single dose treatment with tetrachlorethylene had been given to these people and calculating on the basis of observed cures by this method (this *Bulletin* 1940 Vol. 37 p. 69) the author concludes that reinfection is occurring in both lines, but not at so rapid a rate in the lines provided with latrines. Reinfection occurs in the fields and houses and not in the latrines and the larvae will therefore gradually die out. The author thinks that the provision of these cheap latrines will reduce hookworm infection to an innocuous level.

He also quotes figures which suggest that the provision of latrines has had a beneficial effect in reducing the incidence of dysentery which had already been reduced by the installation of a pure water supply
C II

ARRADIE (Alberto Urbani) Uncomarocia. Su profilaxis desde la escuela. [The School and the Prevention of Hookworm Infection.]—*Prensa Méd Argentina* 1939 Oct. 4 Vol. 26 No. 40 pp. 1942-1944

The advice covers the usual lines—treatment, construction and use of latrines the wearing and renewal of footwear and sanitary teaching. The attitude to the latrine is shown by one child's surprised question—Why should I go into a small room to empty my belly when I have the whole country to do it in?
C L.

DUVOIR (M.) POLLET (L.) BRUMPT (L. C.) & CRÉNEBAULT (J.) Un cas de polyglobulie traité par ankylostomose provoquée. (Résultats favorables sur la polyglobulie et sur l'hypertension artérielle) [Polycythæmia treated by infecting the Patient with Hookworms. Reduction of Polycythæmia and Arterial Tension.]—*Bull et Mém Soc Méd Hôpit de Paris* 1940 Mar 15 86th Year 3rd Ser Nos. 4-5-6 pp. 42-45

A woman of 67 had 7,860,000 red and 9,900 white cells, and there were 41 per cent. of normoblasts in the marrow. The red cells rose to 8,250,000. She developed a right hemiplegia with aphasia and a

haemoptysis. The red cells then fell to 7,300 000. Infective hook worm larvae were applied to the skin of the thigh apparently 300 on each of two consecutive days and about 40 days later the eggs appeared in the stools and in 45 days later the red cells had fallen to 3,570 000 and the haemoglobin to 80. Some of the worms were expelled by thymol and oil of chenopodium with marked benefit but in 4 months the red cells had risen to 6 000 000 when she left observation but she returned some months later with the number of red cells 7 000 000 and haemoglobin 130 and it was calculated that the number of worms was about 200. C L

ROBERTS (F H S) Notes on Some Helminths Infesting Domestic Animals in Queensland.—*Australian Vet Jl* 1940 Feb Vol 16 No 1 pp 30-33 [16 refs.]

Of interest in human medicine is a record of three specimens identified as *Necator suillus* and not as *N. americanus* from the pig and of *Trichostrongylus colubriformis* from the same host species. C L

GALVÃO (A. L.) & DO AMARAL (A. D. Franco) Dermatite linear serpiginosa das praias do litoral paulista. [Linear Serpiginous Dermatitis in Dogs of the Paulista Coast].—*Arquivos de Higiene e Saúde Pública* São Paulo 1939 Sept. Vol 4 No 7 pp 75-84. With 11 figs. on 6 plates [13 refs.] English summary (8 lines)

The authors conclude that the local cause of this condition is the larva of *A. braziliensis* spread by dogs and cats domestic and wild. C L.

NAKIOKA (Kuniharu) Beiträge zur Kenntnis ueber den Einfluss der ultravioletten Strahlen (3900Å-2900Å) auf der Lebewesen. Versuch I Ueber den Einfluss auf das Wachstum der Nematode Eier. [The Influence of Ultraviolet Light on the Growth of Nematode Eggs].—*Sei I Kai Med Jl* 1939 Aug Vol 53 No 8. [In Japanese pp 1195-1238 [16 refs.] German summary pp 1-2]

MALARIA

PRECIS OF ABSTRACTS IN THIS SECTION

HAUSSER (p 598) discusses malaria as an occupational disease in France.

STRICKLAND (p 599) shows that the reason for the high malaria incidence in the valleys below the Chota Nagpur plateau is that in the dry season there are innumerable pools suitable for *Anopheles* breeding left in the course of the swift flowing streams. MONTEL and DO-VAN HOANH (p 599) discuss malaria in Saigon in the native quarters of which town it is a serious cause of sickness and death.

TREILLARD (p 599) discusses the biotype of *A. maculipennis* known as *cambournaci* which he states is to be found in Portugal.

II. The changes observed in the parathyroid suprarenal, hypophysis and islands of Langerhans seem to have no special bearing on helminthological medicine. C L

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DUBOIS (M) POLLET (L) BRUMPT (L C) & CHÉNEBALT (J) Un cas de polyglobulie traité par ankylostomose provoquée. (Résultats favorables sur la polyglobulie et sur l'hypertension artérielle) [Polycythaemia treated by infecting the Patient with Hookworms. Reduction of Polycythaemia and Arterial Tension.] —*Bull et Mém Soc Méd Hôp de Paris* 1940 Mar 15 50th Year 3rd Ser Nos 4-5-6 pp 42-45

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ROBERTS (F H S) Notes on Some Helminths Infesting Domestic Animals in Queensland.—*Australian J et JI* 1940 Feb Vol. 16 No 1 pp 30-33 [16 refs]

Of interest in human medicine is a record of three specimens identified as *Necator suillus* and not as *N. americanus* from the pig and of *Trichostrongylus colubriformis* from the same host species. C L.

GALVÃO (A. L.) & DO AMARAL (A. D. Franco) Dermatite linear serpiginosa das praias do litoral paulista. [Linear Serpiginous Dermatitis in Dogs of the Paulista Coast].—*Arquivos de Higiene e Saúde Pública* São Paulo 1939 Sept Vol 4 No 7 pp 75-84 With 11 figs. on 6 plates [13 refs] English summary (8 lines)

The authors conclude that the local cause of this condition is the larva of *A. brasiliense* spread by dogs and cats domestic and wild. C L.

NAKAOKA (Kuniharu) Beiträge zur Kenntnis ueber den Einfluss der ultravioletten Strahlen (3900Å-2900Å) auf der Lebewesen. Versuch I Ueber den Einfluss auf das Wachstum der Nematode Eier. [The Influence of Ultraviolet Light on the Growth of Nematode Eggs].—*Sei J kas Med JI* 1939 Aug Vol. 58 No 8. [In Japanese pp 1195-1238 [16 refs] German summary pp 1-2.]

MALARIA

PRÉCIS OF ABSTRACTS IN THIS SECTION

HAUSSER (p 598) discusses malaria as an occupational disease in France.

STRICKLAND (p 599) shows that the reason for the high malaria incidence in the valleys below the Chota Nagpur plateau is that in the dry season there are innumerable pools suitable for *Anopheles* breeding left in the course of the swift flowing streams. MONTEL and DO-VAN HOANH (p 599) discuss malaria in Saigon in the native quarters of which town it is a serious cause of sickness and death.

TREILLARD (p 599) discusses the biotype of *A. maculipennis* known as *cambournaci* which he states is to be found in Portugal.

case is made out for the need of any such legislation and it is not evident why the paper should have been written and published at the present time

N W

STRICKLAND (C) Malaria in Chota Nagpur—*Indian Med Ga.* 1939 Dec Vol. 74 No 12 pp 737-740 With 4 figs.

The Chota Nagpur plateau at an elevation of about 2000 feet is mildly malarious. On the other hand the villages on the *ghats* the scarp of the hills and the steep valleys approaching the plateau are extremely malarious. Physiography accounts for the difference. The streams flow fast down the rocky channels of the ghats leaving in the fair season innumerable shallow pools which are ideal for the development of mosquitoes. On the plateau mosquito-breeding places in the sandy river beds are few and far between and are readily accessible to fish. More frequent deviation of anophelines by domestic animals on the plateau may also be a factor of importance. The climate on the plateau is optimal for malaria *genesis*

N W

MONTÉL (M L R) & DO-VAN HOANH Le paludisme à Saigon [Malaria in Saigon]—*Rev Méd Française d'Extrême-Orient* 1939 Aug-Sept No 7 pp 833-842.

The authors on the basis of prolonged clinical experience combat the view that has been put forward as the result of epidemiological enquiries that endemic malaria is of little or no importance in Saigon. This is true for the urbanized European part of the town but in the poorer native quarters where sanitary conditions are deplorable malaria is a serious cause of sickness and death. To meet the criticism made by the epidemiologist that little reliance can be placed on dispensary clinical diagnoses of malaria blood smears of all cases diagnosed as malaria at a Municipal Dispensary during the first ten days of February were examined at the local Pasteur Institute. There were 168 such cases among a total attendance of 560 malaria parasites were found in 104. This is a high proportion in view of the fact that all the patients were sufficiently well to visit the dispensary as outpatients. *P. vivax* was found in 52 *P. falciparum* in 42 and *P. malariae* in 10 [see this *Bulletin* 1939 Vol 36 p 679]

N W

TREILLARD (M) Au sujet d'une variété méridionale de l'*Anopheles maculipennis* [A Southern Variety of *A. maculipennis*]—*Bull Soc Path Exot* 1939 Dec 13 Vol 32 No 10 pp 934-936

The biotype of *A. maculipennis* named *camournaci* hitherto noted only in Portugal and in Camargue at the mouth of the Rhone was first described by the author in conjunction with ROUBAUD [see this *Bulletin* 1937 Vol 34 p 633 1938 Vol 35 p 139]. Subsequent continued observations have enabled the author to determine the permanence of the characteristics determining this biotype. He therefore expresses surprise at a statement made by CAMBOURNAC and HILL to the Third International Congress of Tropical Medicine to the effect that only the classic *A. maculipennis* var. *atroparvus* is found in the very part of Portugal from which originated the first strain of the *camournaci* biotype described. He is convinced that breeding in series from eggs with the characteristic short floats would reveal the continued presence of the biotype

N W

MIYAHARA (Hatsuo) The Quick Staining Method of the Malaria Parasite by Means of Giemsa's Stain.—*Acta Japonica Med Trop Formosa*. 1939 May Vol. 1 No 1 pp 49-55 With 6 figs. on 1 plate.

The author claims that his quick method of Giemsa staining has distinct advantages over other quick staining methods. The film is not fixed with methyl alcohol the dried film is haemolysed in a beaker of water the side of the slide containing the film being first marked. The solvent of the stain 0.003-0.005 per cent. K_2CO_3 or Na_2CO_3 solution is heated to about $60^\circ C$. One drop of Giemsa stain is added to each cc. of the heated solvent. About 3 cc. of the warm solution is poured on the film and left 5 to 10 minutes the film is then washed with water and dried. Schüffner's dots are well stained but they appear finer than they do after alcohol fixation. The paritized cells and the parasites are well stained and their detection is facilitated. No stain granules are deposited on the film. Indifferently prepared films are not a serious drawback after haemolysis. A B

JOELIAS (Alejerto) Die Beziehung der Malaria zum Nervensystem. [Relation of Malaria to the Nervous System].—*Schweiz Med Woch*. 1940 Feb 10 & 17 Vol 70. Nos. 6 & 7 pp 123-124 145-148. [63 refs.]

After a short introduction the author gives a survey of the literature of the subject. He brings out an interesting point namely that in the 1st war in the so-called "war malaria" cases neurological complications took the most important place.

His own observations were carried out at the Malaria Research Station at Rosh-Pina, Palestine. He describes 10 cases of malaria, chiefly malignant tertian, in which nerve complications were present. The 10 cases were only a small fraction of those investigated and treated at the Station.

He classifies the disturbances of the nervous system in malaria into two main groups, viz. acute during the attack and late forms or post-malarial disturbances of nervous system. In the first group the following symptoms either alone or combined, may occur: headache, delirium, stupor, coma, epileptic convulsions, tetanic contractions, cerebral, bulbar and medullary symptoms both encephalitic and meningeal forms. In the second group the following disturbances of the nervous system are listed: neurasthenia, hysteria, psychosis, neuralgia, neuritis, polyneuritis, spinal and peripheral types, vegetative endocrine types and mixed forms.

As regards the explanation of these disturbances he does not consider that the mechanical toxic action of the malarial parasites is a satisfactory explanation. He refers to the work of James and others on the endothelial forms of the parasite so-called E forms. He states that the relation of these endothelial forms to the aetiology of relapse and neurological disturbances in malaria is not yet clear but he inclines to the opinion that their influence particularly on the early and post malarial neurological disturbances, is of great significance.

E D B Grogg

SAÖLAM (Tevfik) Tetanusähnlicher Symptomenkomplex als Äquivalent des Malariaanfalls. [Symptoms resembling Tetanus in Malaria]—*Arch f Schiffs u Trop Hyg* 1939 Oct. Vol. 43 No 10 pp 458-463

THONNARD-NEUMANN (E) Ueber einen Fall von Agranulozytose im Gefolge von Malaria Tropica. [Agranulocytosis accompanying Subtertian Malaria.]—*Arch f Schiffs u Trop Hyg* 1939 Oct. Vol. 43 No 10 pp 453-458 [14 refs.]

GREIG (E D W) assisted by Alexander NEILL. Observations on the Maximum Parasite Rate in Cases of Induced Malaria.—*Jl Trop Med & Hyg* 1939 Dec 15 Vol. 42 No. 24 pp 378-391 With 2 charts

MORISHITA (Kaoru) Some Observations on the Behaviour of the Parasites during Latent Malaria Infection.—*Acta Japonica Med Trop Formosa*. 1939 May Vol. 1 No 1 pp 37-48 [16 refs.]

The author discusses the importance of latent malaria infections and the difficulties of its diagnosis and treatment. He believes that the parasites in latent infections may be attacked by drugs if these are selected with due regard to their species-specificity. In cases of mixed infection treated with cinchona alkaloids or atebirin nearly all relapses are caused by *P. vivax* in cases treated with plasmoquine nearly all relapses are due to *P. falciparum*. In cases in which parasites have disappeared either spontaneously or as the result of inadequate treatment the injection of adrenalin is of use in causing their re-appearance. The chance of detecting parasites in the blood is greatest within the thirty minutes following the injection and the maximum number of such parasites occurs within this period. If a single examination only is possible the film should be made 30 minutes after the injection.

N IV

DZ (R. K.) A Simple Technique of giving Intravenous Quinine with Saline.—*Indian Med Gaz* 1939 Dec. Vol. 74 No 12, p 740

In the treatment of cases of malaria of a choleraic type the author combines quinine treatment with intravenous saline infusion. A solution of quinine is injected into the rubber tube connecting the saline funnel and the needle while the saline is flowing into a vein.

N IV

COPPOLA (Massimo Acquaviva) Osservazioni sulla bilirubinemia nei malarici. [Bilirubinaemia in Malaria]—*Riv di Malarologia* Sez. I 1939 Vol 18. No 6 pp 329-336 [31 refs.] English summary (3 lines)

Individual idiosyncrasies and unusual responses to the administration of quinine prompted the author's observations in a series of cases of chronic malaria. Haemolysis and bilirubinaemia are interdependent estimation of the bilirubin content of the serum was made. In 13 cases the estimation was made 3 to 4 weeks after the completion of a course of quinine treatment in 9 other cases the estimations were made immediately after the completion of a ten-day course of quinine in

doses of from 1 to 3 gm. a day. Three others were cases of chronic malaria that showed signs of quinine intolerance. In four other cases of chronic malaria estimations were made before and after the administration of quinine. In two of these a noteworthy fall in the bilirubin content was noted in the second observation. The observations lend support to the view that variations in bilirubin content of the blood are more likely to be caused by the malaria infection than by any possible haemolytic action of quinine. There was no evidence that quinine influences the normal process of haemolysis. N IV

HERPOMH M. Some Notes on Cinchona Culture and the World Consumption of Quinine.—*Bull Colonial Inst Amsterdam* 1939 Dec Vol 3 No 1 pp 36-51. With 4 plates

This account of the present position of the cinchona industry, is coupled with the history of cinchona culture in Java, Ceylon and India and a consideration of future increased production to meet all probable future increased demands. The facts which are well known are very well presented. In 1913 the cinchona bark producers of Java made an agreement with quinine manufacturers by which the supply and sale of cinchona bark were adjusted to the world consumption of the drug. The Java cinchona plantations could produce a very much greater quantity of bark than is harvested now. The author realizes that the world's need for quinine is not the same thing as the world's demand for the drug, but he combats the prevalent idea that the high price of the drug is an important factor in limiting consumption. In 1933 the official price of quinine was decreased 25 per cent but this reduction was followed by no material increase in consumption. Retail prices of the drug are but little affected by wholesale fluctuations in the price of bark. Governments that purchase quinine for free distribution are generally furnished with the drug at rates lower than market price. The cost of quinine is not a very large item in comparison with the cost of an efficient anti-malaria organization which supervises its distribution. The Netherlands Indies Government has sufficient guarantees that the agreement of 1913 should not be used in such a way to hamper malaria control. Cinchona growers would welcome the opportunity to increase their output, and so carry on their business in more normal conditions. A IV

PIZZILLO (Giuseppe). Risultati a distanza nelle primoinfezioni malariche trattate con la cura adrenalinica venosa. [Late Results of Primary Malaria Infections treated with Intravenous Adrenalin Injections].—*Riv di Malaricologia* Sez I 1939 Vol 18 No 6 pp 361-373. German summary

The author reports on the condition of 57 patients whose primary attacks of malaria, from 7 to 20 months previously, had been treated with intravenous injections of adrenalin. Thirty-eight of these patients had had *P. falciparum* infections. The state of health of all 57 patients was excellent, blood counts were normal, none harboured parasites, none had suffered from any relapse, and in none was there any splenic enlargement. Henry's reaction was negative in every case. A IV

JUNGE (Werner) Zur Dauerverträglichkeit und Dosierung der Atebrin Prophylaxe [The Tolerance and Dosage of Atebrin as a Prophylactic.]—*Arch f Schiffs u Trop Hyg* 1939 Sept. Vol. 43 No 9 pp 409-411

The author has observed 20 Europeans in Liberia who have taken atebrin as a prophylactic over a period of 7 years. Altogether each adult took 143 gm during the period and no injury to health which could be attributed to atebrin was observed even when intestinal or gastric trouble occurred there were other causes for instance errors in diet or hookworm disease. The condition of the blood remains normal and pregnancy and parturition are not affected. Yellow coloration of the skin is constant.

In one patient who had taken prophylactic atebrin for six years an attack of malaria occurred which could not be controlled by therapeutic doses by the mouth but injections proved effective.

The prophylactic dose at first given was 0.1 gm. daily. This was effective but produced intense yellow coloration of the skin. The dose was therefore reduced to 0.05 gm daily and the yellow coloration though slighter was still apparent. No malaria was seen during 3½ years under this dosage. For 1½ years the dose was reduced to 0.3 gm given on one day each week but this was insufficient as four fifths of the persons suffered severe attacks of quartan or subtertian malaria. The best prophylactic measure with atebrin therefore appears to be the daily administration of 0.05 gm.

C II

REVIEWS AND NOTICES

ROGERS (Leonard) [K.C.S.I. C.I.E. M.D. F.R.C.P. F.R.C.S. F.R.S. I.M.S. (ret'd.) etc.] & MUIR (Ernest) [C.I.E. M.D. F.R.C.S. Edinburgh Medical Secretary British Empire Leprosy Relief Association etc.] *Leprosy* 2nd Edition.—pp xii+260 With 81 figs. (71 on 34 plates & 2 maps) 1940 Bristol John Wright & Sons Ltd. London Simpkin Marshall Ltd [15s.]

The appearance of a new edition of Rogers and Muir's book on leprosy is an important event in tropical medicine.

In their preface the authors state that the period of fifteen years since the publication of the first edition has been one of unexampled progress in our knowledge of leprosy.

They might have added that even greater progress has been made in the spread of knowledge of the disease among the medical profession and the educated public. Indeed the outlook on leprosy has undergone a revolution and the authors might justly claim to have been the leaders of a movement which has brought hope to the leper and courage to his doctor.

The volume contains abundant evidence of the truth of the statement in the preface that the authors have embodied extensive studies of published works and have used the prolonged clinical experience gained by one of them in India and in recent tours made in Africa on behalf of the British Empire Leprosy Relief Association.

It might seem at first sight that an undue proportion of the book has been devoted to the broader aspects of leprosy as nearly half of the text deals with the history, distribution, epidemiology, communicability and general principles of prophylaxis of the disease but these matters are treated in so masterly a manner that no reader would

wish this part of the book to be curtailed by a single page even the layman will be fascinated by the clear and vivid account which is given of leprosy through the ages and throughout the world.

These chapters also form an essential preliminary to the proper grasp of the remaining chapters which contain a concise account of the aetiology, prevention and clinical aspects of the disease including the modern methods of treatment.

Despite the fact that the book is essentially a practical guide to the diagnosis, treatment and prevention of leprosy many readers will feel disappointed that the authors have said so little about the part which they have played in the initiation and popularization of the methods of treatment and prevention which are now adopted by the great majority of medical men in the countries where leprosy exists.

The most critical reader will fail to find the slightest support for the suggestion formerly made by some workers that Rogers and Mirr make exaggerated claims for the results obtained by modern drug treatment of leprosy on the contrary they emphasize the limitations of the special remedies and insist on the great importance of building up the resistance of the body by such means as diet, exercise and cheerful surroundings.

The chapter on modern prophylaxis is the most important in the whole book, this gives in a few pages what every doctor and health worker ought to know about the control of the disease.

The segregation of all infective persons is naturally regarded as the ideal means of preventing the spread of leprosy but at the same time it is made quite clear that compulsory isolation has been a failure in nearly all the countries in which it has been tried the reason being that it leads to the concealment of the disease during the stage of greatest infectivity.

Although the authors recognize the great differences which exist in various parts of the world and therefore dogmatize only on the basic principles of prevention they hold that in most tropical countries the most successful method of controlling the disease is the "Propaganda Treatment Survey system" which was initiated by themselves.

Special stress is laid on the need for persuading patients to seek treatment as soon as signs of the disease appear so that the infectious stage may be prevented or shortened, also on the need for periodical examination of all who have come into close contact with infectious patients and on the importance of providing acceptable institutional treatment for all who cannot safely be treated as out-patients.

The classification of the types of leprosy follows the recommendations of the International Leprosy Congress held at Cairo in March 1938 it is to be hoped that this will be generally adopted by leprologists.

Eighty-one excellent illustrations are reproduced on 34 pages of art paper and these form a very valuable feature of the book whose general get-up is creditable to the publishers.

Altogether the book is a clear, concise and thoroughly reliable guide to every aspect of leprosy no doctor or sanitarian in the tropics will be able to regard himself as properly equipped for dealing with the disease until he has become familiar with the contents of this handy volume.

As has already been indicated the first half of the book will be found interesting and profitable by all educated laymen in countries where leprosy is a problem.

JOHN W. D. MCGRAW

Printed under the authority of His Majesty's Stationery Office
by the South Essex Record Office, Ltd. (Edinb.)

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No 9

SUMMARY OF RECENT ABSTRACTS *

VII HELMINTHIASIS

[continued from p 547]

Ascaris infection etc —LANE (p 721) restates certain essential points in the diagnosis of *Ascaris* infection. For successful diagnosis by D C F four essentials are necessary. —The presence of fertile eggs, the proper disintegration of faeces, the use of a vessel large enough to prevent over-concentration and especially a floating fluid of ascertained specific gravity of just over 1.200. With these conditions satisfied the variations in D C F counts are much smaller and the numbers of eggs recovered much larger than with the Willis technique. Three-quarters saturation of salt solution is optimum for hookworm eggs but for *Ascaris* and *Trichuris* is insufficient and leads to great error. He refers to airborne infection by *Ascaris* and to the breeding of cockroaches which may disseminate *Ascaris* eggs in bore-hole latrines adding a comment that search for a better type of latrine should be continued.

LEATHERS *et al* (p 592) using the Stoll Hauscherr technique found infection with *Ascaris* in 1.9 per cent of whites and 6.5 per cent of negroes in Florida. The more persons in a family infected the greater was the average weight of infection as judged by egg counts.

From autopsy examinations on patients whose stools had been examined during life Hsu and Chow (p 144) show that examination had detected only 70.4 per cent of persons infected with *Ascaris*. Direct smear with floatation or other methods when indicated, had been employed. WINFIELD and CHIN (p 319) refer to the important part played by children in polluting the household environment in an urban population in N China.

YOSHIDA and TOYODA (p 722) discuss the artificial hatching of *Ascaris* eggs in different media. The most favourable temperature was between 36° and 40 C. In comment LANE refers to the work of BROWN which showed that the only condition which inevitably produced hatching of mature eggs was drying followed by moistening.

SANG (p 321) has found in a watery extract of *Ascaris* a protease which inhibits the action of trypsin. This effect presumably explains

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

the mobility, sometimes found in patients with this infection, to digest protein. VANNI (p 724) found in the coelomic fluid of *Parascaris equorum* a substance capable of producing the Sanarelli phenomenon in sensitized rabbits, together with the allergic symptoms urticaria and asthma which in man may be caused by the body fluid of *Ascaris*. VOEGTLIN (p 321) reports *Ascaris* and NESPOLO (p 321) report death from back of the throat. MILLAN and the trachea of a child. PIRRES (p 722) reports asphyxia from *Ascaris* in the trachea, intestinal suffocation due to several *Ascaris* from *Ascaris* were passed, and an obstruction relieved when 280 of the worms were passed, and an extraperitoneal abscess containing a decomposing *Ascaris*. RAJAHRAM (p 321) found in a child five abscesses of the liver each of which contained *Ascaris*. The bile ducts were dilated and inflamed and contained more of the worms. LEGERGUE (p 723) records a fatal case of acute haemorrhagic pancreatitis probably due to *Ascaris* in the bile ducts near the duct of Wirsung. FLAMANT (p 723) reports perforation due to *Ascaris*, of all coats of the appendix except the serosa. ZAHAWI (p 321) reports death from obstruction of the small intestine due to a mass of *Ascaris* weighing two pounds. The wall of the greatly enlarged appendix which contained four of the worms was found to be thinned and its mucosa was absent.

HO (p 322) records the escape of 16 *Ascaris* through the umbilicus of a child, who showed no other ill-effects. CHANCO (p 723) also reports the escape of *Ascaris* from the umbilicus of a child.

For the treatment of *Ascaris* infection MAPLESTON and MUKHERJI (p 322) use oil of chenopodium together with santonin but point out that reduction of the amount of the former in children to conform with age in the usual manner renders the treatment unsuccessful. This they think may be due to the fact that whatever the size of the host, the worms are the same or that as the worms more readily infect young than old, it may be a matter of power to maintain position. LANE in comment suggests that the power to produce the true anthelmintic substance from absorbed ascaridole is not so marked in the young as in the adult and quotes other work which shows that ascaridole is, in fact absorbed and changed in the human body its products being excreted in the urine.

DEMESTER (p 320) in W. Samoa found a discrepancy between the infection rates with *Ascaris* and *Trichuris*. These rates theoretically should be similar and he attributes the comparatively low *Ascaris* rate to the mass treatments which have been given since the sanitary conditions have long been static. Mass treatment which is the only present method of control is therefore justified.

Enterobius and *Strongyloides* infection.—CRAM and REARDON (p 845) report *Enterobius* infection in 41 per cent of a group of more than 2,000 white people from Washington. Infection is commonest in the congested residential sections of the city but is heavy even in good social conditions.

NOLAN and REARDON (p 845) found eggs of *Enterobius* in dust collected at all levels in all the rooms of 7 houses in which lived infected persons. Some of the eggs must have been carried by air currents and infection by inhalation is therefore theoretically possible. A large proportion of the eggs were probably viable. HALL (p 846) points out that as *Enterobius* eggs are not except by accident faecal constituents, they are not prevented from spreading by the ordinary sanitary measures which limit ordinary intestinal parasites. Eggs when

dry will fall from the body and sift through clothing to be spread widely and even carried by air. Treatment is probably the only effective means of combat but the use of a vacuum cleaner may help. REARDON (p 329) has found a mean of 11 105 eggs to each gravid female *E. vermicularis*. This partly explains the familial nature of the infection and the fact that it is the commonest worm infection of man.

JONES (p 328) describes the technique of examination for eggs of *Enterobius* by means of the Cellophane NIH swab and REARDON (p 328) points out that certain artifacts which may simulate the eggs are often found embedded in the Cellophane.

WRIGHT and BRADY (p 329) advocate gentian violet *per os* in the treatment of *Enterobius* infection. Details of dosage are given. WRIGHT *et al* (p 846) report clinical improvement following single doses of tetrachlorethylene. HANBURGER (p 846) points out the danger of the production of neurosis from over treatment of *Enterobius* infection.

TORRES and DE AZEVEDO (p 844) found post mortem evidence that larvae of *Strongyloides* born presumably in the intestinal canal had penetrated the wall of the colon entered the lymph or blood stream and reached the liver and lungs. GALLIARD (p 328) however holds that auto-infection by *Strongyloides* is not common and quotes three post-mortem examinations of infected persons in whom active rhabditiform and filariform larvae were found with no sign of penetration of the intestinal wall.

DE PAULA E SILVA (p 843) states that examination of duodenal contents is a more certain means of diagnosis of *Strongyloides* infection than is faecal examination.

SNIPSON (p 844) describes the treatment of *Strongyloides* infection by means of compound solution of iodine introduced into the duodenum through a tube.

Ankylostomiasis etc—LEATHERS *et al* (p. 828) examined the faeces of 29 064 white persons in Florida by the Stoll Hausheer technique. The average percentage found infected with hookworm was 34.8 but was least in those districts in which the economic state was best and in which the standard of sanitary cleanliness was highest. The peak of infection was found between the ages of 15 and 19 years. It was once more shown that the more infected in a family the higher the egg count per person. The proportion found infected in 4 121 negroes was 19.9 per cent. In a series of 809 autopsies in Peiping Hsu and CHOW (p 144) found 127 infected with hookworms (*A. duodenale* or *N. americanus*). Of these 72 had undergone stool examination during life but in 45 no ova had been found. The direct smear method with floatation or other methods when indicated had been used in the laboratory. MORSE (p 829) found infestation with both *A. duodenale* and *N. americanus* in Provinces of Italian Somaliland in which hookworm infection had not previously been known to exist. Of 423 negative to a smear infection was found in 45 per cent by the Willis technique.

Writing of overt blood loss in relation to anaemia SCOTT (p 324) states that hookworm infestation is probably the commonest world wide cause of such loss. In a healthy man iron exists in the haemoglobin (about 2.3 gm) in the iron reserve of the liver bone marrow and spleen (about 1.15 gm) and in unavailable form in the tissues. A man may lose half his blood and yet may recover completely from the anaemia without the administration of iron by using up his iron

reserve but if that reserve is gone even trivial haemorrhage will lead to persistent anaemia. DLAZ (p. 323) in the city of Resistencia found no correlation between the estimated weight of hookworm infection in children and the anaemia induced.

Ankylostomiasis is an industrial disease in the French miners of the Loire and DORROW (p. 322) found infection in 1,236 of some 7,000 examined by the Telemann method. Symptoms were not found in 83 per cent of these the rest were anaemic, some gravely so. Treatment is by freshly powdered thiothol in cachets, three doses each of 1 gm given at hourly intervals on three consecutive days a total of 9 gm. A purge is given on the fourth day and all treatment is given in hospital.

FEERY (p. 831) describes the pathological findings in three cases of fatal poisoning after the accidental drinking of large quantities of carbon tetrachloride mixed with ethylene dichloride. Two patients who lived for a few days showed extensive necrosis in the liver especially in the central zone of the lobules and damage to the convoluted tubules of the kidneys. Jaundice and multiple haemorrhages were also present. GONZALEZ (p. 832) reports decomposition of tetrachlorethylene with the production of phosgene. Symptoms which had followed the administration of this impure specimen were rapid, small pulse with pallor, shallow and sighing respiration, indistinct speech, dullness of vision and drowsiness but there were no deaths.

FERNANDEZ *et al* (p. 832) report favourably on tetrachlorethylene in treatment. It was given in doses of 3 to 8 cc in Mist. alb and the best results were obtained with the largest doses. There was no toxic action on liver, kidneys, heart or lungs but temporary effects resembling those of narcotic drugs may be produced. Children may be given doses of four to five times the age in minims.

PESSOÁ and PASCALE (p. 323) in São Paulo found the greatest weight of infection over 20 as evidence of acquired age resistance and regard the diminution over 20 as evidence of acquired age resistance. In communities in which simple (presumably pit) latrines are used only about half as many eggs per gm of faeces were found as in those in which there were no latrines. There was no direct relationship between detected egg numbers and the percentage of haemoglobin.

Tetrachlorethylene treatment reduced egg numbers by 48 to 49 per cent after one administration and by 73 to 84 per cent after two but the numbers of Ascaris eggs were increased by 8 per cent after 2 cc of the drug had been given.

SCOTT and BAILLOU (p. 36) show that the provision of bore-hole latrines in the village houses of Egyptian peasants has not resulted in a lowering of the rate of infection with hookworms and schistosomes. These infections however are acquired under field conditions and house sanitation can hardly be expected to influence them significantly but it is hoped that the people once accustomed to using latrines in their homes may be induced to accept and use them in the fields.

NICHOLS and GONZALEZ (p. 590) describe a method of composting night soil in refuse which destroys eggs of Ascaris and the free-living stages of hookworms. The night soil is trenched into rectangular heaps of refuse covered and watered daily. Each week for four weeks the mass is turned over so that the outer portions are placed in the middle and further night soil is trenched in the mass. Thereafter the

daily watering and weekly turning are repeated for three months by which time the mass in parts of which the temperature reaches 60°C has become a fine mould. The proportions of night soil to refuse are given in the original abstract. The method can be used in the rainy season.

ROUBAUD and DESCHENS (p. 833) have found that infective larvae of hookworms and *Strongyloides* are captured and digested by certain microscopic fungi if the soil is seeded with the fungi.

FISK (p. 591) reports the finding of nine *N. americanus* and 147 *A. duodenale* in the intestine of a child aged one month and eight days who died from the infection and suggests that it must have been set on the ground near a latrine but in comment LANE points out that the closely related *A. caninum* can apparently be transmitted from a pregnant dog to its foetus. AKETAGAWA (p. 325) concludes from experiments with *A. caninum* that infective larvae swallowed by dogs penetrate the wall of the alimentary canal and do not remain in the lumen. On examination of the bodies 3 to 4 and 10 days after the infective feed the proportions of larvae recovered were in pups about 50 and 98 per cent but in adult dogs this was reversed and lowered to 24 and 37 per cent respectively. The foetuses in pregnant bitches were infected, chiefly in the lungs.

OTTO and KERR (p. 833) injected small numbers of living infective larvae of *A. caninum* into dogs at bi-weekly intervals and subsequently gave large infecting doses (up to 200 000 larvae) to these animals and to controls. The health of the immunized animals was scarcely disturbed and comparatively few worms were recovered at autopsy but all except one of the controls died within 14 days and the number of worms recovered was very much larger. It is concluded that there is nothing distinctive about the so-called age resistance but rather that maturity and good health are essential for the host to respond fully and quickly to the stimulus of invading worms i.e. actively to acquire immunity.

1. BRAND and OTTO (p. 325) show that *A. caninum* does not appear to store glycogen presumably because of the continuous food supply available in the process of sucking blood and that heavy infestation with this worm does not affect the carbohydrate metabolism of the host.

SCHENKEN and MOSS (p. 845) describe the first reported case of *Trichostrongylus colubriformis* infection of man in America.

Filariasis—The work of O CONYOR and KNOTT (p. 151) on a patient with chylous lymphatic varix which was excised and which contained adult *W. bancrofti* confirms previous opinion that development of embryos *in idero* is simultaneous [in the different living females]. It was originally thought that parturition always occurs about noon but the present study does not uphold that view.

AHALIL (p. 328) believes that the periodicity or non periodicity of *W. bancrofti* embryos is governed by the site of the adult worm in the human body and that this again is influenced by the biting habits of the vectors. In the South Pacific the vector is *Aedes* a day biter which chiefly attacks the upper extremities the adults inhabit the corresponding lymphatics and the embryos pour directly into the veins of the neck or the terminal part of the thoracic duct there is no periodicity in the blood. Elsewhere the vector is *Culex* an evening biter which chiefly attacks the lower limbs the adults inhabit the corresponding lymphatics and the embryos pass into the thoracic duct.

In the daytime man's position is mainly erect and gravity retains the embryos from the legs in the lower part of the thoracic duct and its tributaries at night man's attitude is horizontal, and the maximum flow of chyle which is said to take place about 12 hours after a meal aids gravity in dispersing the embryos into the circulation about midnight. In comment LANE quotes BAHR's work in the S. Pacific which showed that the habitat of the adult worms showed no perceptible discrimination in favour of the arm and BURTON's work which indicated that the location of enlarged and presumably infected glands had no obvious relationship to the type of infection. Khalil further states that embryos disappear into the lymphatics when absent from the peripheral blood.

He also claims that warmth attracts adult *W. bancrofti* that the spermatheca region is the warmest in the body and that since the lymphatics of that region are the first in which the valves lose their function, there is direct communication between them and the pelvic and abdominal lymphatics, with the result that the worms migrate back and forth between them and the genitalia while most patients suffer no symptoms. If however the worms block a vessel it dilates and may leak, causing lymphangitis of an allergic nature. "Filarial lymphangitis elephantoid fever Calabar swellings the various skin manifestations of onchocerciasis and *A. persians* infection are different grades of the same phenomenon and bacterial infection is only secondary. In treatment, therefore adrenalin will be useful.

Hsu (p. 836) shows that *Culex vagans* is a very suitable intermediate host for the larvae of *W. bancrofti*. When a series of *C. vagans* and a series of *C. pipiens* var. *pallens* were fed at the same time on the same infected person, 74 out of 78 of the former and 47 out of 49 of the latter showed infective larvae after 12-18 days. GALLIARD (p. 150) found that the larva of *W. bancrofti* is able to reach the infective stage in *Aedes aegypti*. VAN BECKERING (p. 834) found a naturally infected *A. ludlowi* in the Mentawai Islands Sumatra. YAO *et al.* (p. 150) observed development of *Mf. bancrofti* in *Phlebotomus argentipes* var. *mongolensis* as far as the post-sausage form. It is thought that further development might have occurred had the insects remained alive for a longer period.

YOKOGAWA (p. 838) found that larvae of *W. bancrofti* were completely digested when ingested by Cyclops monkeys into whose alimentary canal larvae were introduced did not become infected. Larvae did not penetrate when placed on the intact skin of animals, but did so when the skin had been treated with a depilatory and then needled, and the author obtained evidence suggesting that one larva penetrated through a mosquito puncture. He concludes that the spread of the disease is largely a matter of chance and is limited by a number of adverse factors. In a search for alternative hosts which might be concerned in the transmission of *W. bancrofti* YOKOGAWA and YOSHINO (p. 837) were unable to find that the flea *Pulex irritans* played any part.

The work of ITENGAR (p. 148) shows that *Mf. malayi* and *Mf. bancrofti* are widespread in Travancore and that the former which has a rural distribution in coastal sandy areas is the more prevalent, while the latter with an urban distribution is less so. Male genitalia were affected far more frequently in *Mf. bancrofti* infections than in those due to *Mf. malayi* the reason for this is not yet understood.

Evidence is given to show that *Mf. malayi* is transmitted by Mansonoides species especially *M. akusifera* which breed in connexion

with the floating water plant *Pistia stratiotes* the larvae taking air from the air spaces which exist in the roots of this plant. Clearance of this plant from the surface of water results in rapid disappearance of the larvae and in ponds in which *Pistia* is not present no *Mansonioides* are found. The food materials of the larvae are provided in the process of steeping coconut husks in water an essential step in coir making which is a staple industry of the area and which is carried out in tanks on which *Pistia* grows. The larvae cannot therefore be attacked through their food supply but the removal of *Pistia* is strikingly successful in eliminating *Mansonioides*. DASSANAYAKE (p 834) states that in Galle Ceylon although infection with *M. bancrofti* transmitted by *C. fatigans* is common elephantiasis of the leg known as Galle leg is due to infection by *Mf. malayi* which does not cause genital infections. *Pistia stratiotes* and *Mansonia uniformis* are abundant in places where infection is due to *Mf. malayi*.

In the Federated Malay States endemic filariasis is due to *Mf. malayi* and POYNTON and HODGKIN (p 149) show that this infection is confined to low lying areas near rivers and swamps. Infection with *M. bancrofti* is sporadic apart from Singapore. Elephantiasis is common especially in adult males who work or live in swamps where they are bitten by the vectors of *Mf. malayi* the genus *Mansonioides*. The authors consider that the female worms discharge a fresh batch of embryos about once each month and that this causes the recurrent attacks of lymphangitis which are set up by the migration of enormous numbers of the sheathed microfilariae through the walls of the lymphatics to the blood stream. The microfilariae die in the thickened lymphatic walls and set up intense local reaction. The proportion of embryos in the day and night blood was found to be only 1 to 5 as against 1 to 1 000 with *Mf. bancrofti*. The authors give information regarding elephantiasis and the results of intradermal tests with an antigen from *Dirofilaria immitis*. For prevention they advocate the removal of dwellings away from swamps and the draining of swamps. (It is later shown by HODGKIN this *Bulletin* 1940 Vol 37 p 302 that the principal vector *M. longipalpis* does not develop in association with *Pistia stratiotes* but rather in association with the fine roots of certain swamp-loving trees. Removal of *Pistia* is therefore not a useful measure of control in this area.)

POYNTON and HODGKIN (p 839) have found microfilaria indistinguishable from *Mf. malayi* in a monkey *Macaca irus*.

GALLIARD (p 837) obtained transformation of *Mansonia* species from fourth stage larvae and pupae to adults in distilled water in Indo-China and concludes that the larvae and pupae can on occasion obtain oxygen directly from the water surface like other mosquitoes instead of through the water plants with which they are usually associated.

KNOTT (p 152) discusses the treatment of elephantiasis of the leg. Prolonged firm bandaging effects a gradual removal of the lymph oedema, the patient gets prompt symptomatic relief and the recurrent attacks of lymphangitis cease. A bandage boot of Turkish towelling cemented to a crepe bandage by dextrin syrup and supported by lateral splints should be applied to the foot and leg tightly enough to cause cyanosis of the toes. Cyanosis disappears on walking when movement forces the lymph upwards. When the limb shrinks a new boot may be applied. If the thigh also requires support burlap strips are used over the towelling and splints and lacing is run into this so that the covering

injection of Carvasept (a preparation of thymol) in olive oil or gum arabic, or the oral administration of Butolan (Bayer) is lethal to a proportion of reproductive adults in rats. A clinical trial of the latter should be made. Excellent results have followed the intravenous injection of 5 cc gluco-calcium (Lilly) during the migratory phase and this therapy should be further tried. Calcification after encystment may be hastened by vitamin D and calcium administration and further trials of this method are indicated, but it is valueless before encystment has taken place.

FOSTER and JOHNSON (p. 850) show that if the eggs of *Capillaria hepatica* are found in human faeces they have been ingested with food. The eggs are not visibly affected by cooking and occur not only in the liver of the rat and the dog, but also of the peccary and certain monkeys of Panama which are used as food by the natives. WRIGHT (p. 155) working in the same area arrived at a similar conclusion.

C. WILCOCKS

RABIES

A REVIEW OF RECENT ARTICLES XXXIII*

1. 1939

The characteristics of four strains of street virus isolated at the Pasteur Institute at Dakar (A O F) have been examined by LÉPINE, MATHIS and SALTTER.¹ All four showed exalted virulence but two of the four were mutable only with difficulty. The authors state that nothing could be more dangerous than to allow the idea to take root that the normal rabies of A O F was of the *enclous faux* type with attenuated virulence. On the contrary even in A O F strains of exalted virulence resistant to experimental adaptation are met with.

At the Pasteur Institute at Shanghai, the fixed virus employed is a strain from Saigon *ex Paris*. The vaccine in A O F strains of original formula of FÉROU, LIZOU,² reports that during the period April 1939 to January 1939 this fixed virus employed is a phenolized at 22°C when inoculated intraperitoneally into guinea-pigs, caused infection in two out of 10 instances. That this was a true rabies infection was confirmed by subpassage.

Further experiments by RAYVAL and LIZOU,³ gave similar results. 5 out of 8 and 2 out of 3 guinea-pigs becoming infected with the Saigon strain. Using the Paris Pasteur Institute strain, 1 out of 6 rabbits, 8 out of 10 guinea-pigs, 7 out of 10 rats and 10 out of 10 mice were infected by intraperitoneal inoculation. The Saigon strain (*ex Paris*)

For the thirty-second of this series see this Bulletin, 1940 Vol 37 p 181
LÉPINE (P), MATHIS (Maurice) & SALTTER (V) M.D. Ser quatre souches de
virus rabique des rues, originaires de l'A O F—Bull Soc Path Exot
1939 Nov & Vol 32 No 9 PP 852-856
LIZOU (Y Ch.) Sur l'infection rabique du cobaye par la voie péritonéale—
C R Soc Biol 1940 Vol 133 No 194-196
RAYVAL (J H) & LIZOU (Y Ch.) La voie péritonéale dans l'infection
rabique expérimentale—C R Soc Biol 1940 Vol 133 No 2
PP 233-240

appeared to be less active when introduced into the peritoneum infection occurring in 0 out of 6 rabbits 2 out of 10 guineapigs 4 out of 10 rats and 5 out of 10 mice. It thus appears that the virulence of a fixed virus strain as judged by intra-cranial inoculation into the rabbit differs from that determined by intraperitoneal inoculation.

The survivors from the above experiments were tested by LIEOU⁴ for immunity the infecting dose being administered after 1 to 1½ months interval. In this experiment 4 out of 8 rabbits and 3 of 4 guineapigs proved refractory to inoculation into the anterior chamber of the eye.

Slow desiccation over caustic potash causes loss of infectivity of rabies virus in 4 to 6 days whilst after rapid desiccation *in vacuo* virulence may be maintained for from 3 to 4 or even more months. REMLINGER and BAILLY⁵ find a very different state of affairs in the case of the AUJESZKY virus. After slow desiccation this virus retains virulence for 200 days that is to say it is 50 times more resistant in this respect than rabies virus. On the other hand the two viruses do not differ when desiccation is rapid, both remain virulent for some 100 days. The authors suggest that this apparent paradox can be explained in terms of differing types of proteolytic ferments.

HOYT and WARNER⁶ find that rabbit brain fixed virus rabies exhibits considerable resistance to the action of urea (60 per cent. of one-third saturated urea in normal saline to 40 per cent. fixed virus brain incubated at 37°C for 24 or 48 hours). This virus maintained its antigenicity in four experiments and its infectivity in at least two tests in the presence of a concentration of urea which was sufficiently high to liquefy most of the virus-containing brain material.

Pseudorabies has already been observed in the Danube basin Brazil the United States Holland Denmark Russia France Spain Tunis Turkey and Germany. REMLINGER and BAILLY⁷ now add to that list Morocco and the animal affected was a three months old Basset hound, born and bred in Algeria. It had lived under conditions which made it unlikely that infection could have been imported and the authors are forced to envisage the possibility of a spontaneous or *de novo* origin. The strain of virus in question presented no unusual features and did not differ from the classic type.

From observations on three strains of virus isolated at Coquilhatville (Belgian Congo) JADIN⁸ finds that whilst the rabbit is difficult to infect with the virus of *oulou falo* and the guineapig is even more so white mice are receptive and the virus may be fixed by subpassage in these animals with ease.

⁴ LIEOU (Y. Ch.) Immunité acquise contre la rage par voie péritonéale.—*C. R. Soc. Biol.* 1940 Vol. 133 No. 2 pp. 241-242.

⁵ REMLINGER (P.) & BAILLY (J.) Action comparée des dessiccations lente et brusque sur les virus de la rage et de la maladie d'Aujeszky.—*C. R. Soc. Biol.* 1940 Vol. 133 No. 3 pp. 395-397.

⁶ HOYT (Anson) & WARNER (Douglas) Urea-Treated Virus as a Vaccine against Rabies.—*Proc. Soc. Experim. Biol. & Med.* 1940 Jan. Vol. 43 No. 1 pp. 154-156.

⁷ REMLINGER (P.) & BAILLY (J.) Premier cas marocain de la maladie d'Aujeszky.—*Bull. Acad. Méd.* 1940 Mar. 19 & Apr. 2 104th Year 3rd Ser. Vol. 123 Nos. 11 & 12 pp. 233-239.

⁸ JADIN (Jean) Sensibilité de la souris blanche au virus rabique isolé à Coquilhatville.—*Arch. Internat. Méd. Expér.* 1939 Dec. Vol. 14 No. 3 pp. 175-183 [10 refs.]

	Number treated	Accidents		Percentages		
		Total	Fatal	Total	Fatal	Non-Fatal
1 Cords	152,899	43	5	0.029	0.003	0.024
2 Dilutions	75,141	24	17	0.031	0.018	0.013
3 Killed phenol	455,795	55	14	0.011	0.003	0.008
4 Live phenol	7,008	0	0	0	0	0
5 Fermi Vaccine	28,159	4	3	0.014	0.011	0.003
6 Fermi's S.V.	390	0	0	0	0	0
7 Heated	140,859	8	2	0.006	0.001	0.005
8 Killed ether	90,019	8	4	0.010	0.004	0.006
9 Mixed (a)	57,227	23	3	0.040	0.005	0.044
(b)	7,307	2	0	0.027	0	0.027
(c)	6,616	3	0	0.045	0	0.045
10 Yaten	5,384	3	0	0.056	0	0.056
Total	1,060,832	181	48	0.017	0.005	0.012

and this table is further summarized as follows —

	Number treated	Total accidents		Fatal	Percentages		
		observed	calculated		Total	Fatal	Non-Fatal
Killed vaccines	579,714	64	99	18	0.011	0.003	0.008
Live vaccines	299,530	99	51	25	0.033	0.008	0.025
Heated vaccines	140,859	8	24	2	0.006	0.001	0.005
Other	40,579	10	7	3	0.025	0.007	0.018
Total	1,060,832	181	181	48	0.017	0.005	0.012

From which it appears that the occurrence of accidents—fatal and non-fatal—is about three times as great with living vaccines as with killed vaccines—and that heated vaccines are even safer.

A second section of this review deals with rabies treatment in the U.S.S.R. during the years 1935-37. The data are not very satisfactory but they bear out in general the conclusions of the main report.

In a comprehensive article dealing in turn with practically all of the problems which arise in antirabies treatment, PROCA and BOBES¹³ compare the results of treatment at Bucharest with those obtained from other institutes as given in the 8th League of Nations review. The field covered is so great and the subject matter so diverse that it cannot be given in detail in this review—but the system employed by these authors of comparing the statistics of their own institute under each heading of the schedule issued by the League with those obtained with other methods of treatment and at other institutes,

¹³ PROCA (G.) & BOBES (S.) Anti-Rabies Immunization. Living Vaccines and Killed Vaccines.—*Bull. Health Organisation* (League of Nations.) 1940 Vol. 9 No. 1 pp. 79-130. Ref. in footnotes.

as given in the League of Nations reviews is exactly what was in the minds of those who at the Paris Conference formulated the resolution which led the Health Section of the League to collect and analyse all the available data. Step by step the authors are led to the conclusion that there seems to be no valid reason for having recourse to live vaccines and accepting the risks which they involve. In these circumstances should live vaccines be abandoned and chemical vaccines used exclusively? Or would it be sufficient to define more exactly the indications and contra indications of live vaccines? An International Rabies Conference could alone decide this point with the necessary authority and competence. [It was I understand the intention of the League to hold such a conference about this time but circumstances have not proved favourable and I am afraid each director will have to decide the question on his own initiative.]

A critical review of published data on the immunizing potency of antirabies vaccines as estimated by animal experiments is furnished by WEBSTER¹⁴. Only those experiments have been considered which are suitable for at least a crude statistical analysis omitting for the most part reports without protocols without controls and at least five test animals per experiment. This comprehensive compilation of results is a very valuable contribution to the literature of rabies. Detailed tables are given referring to pre-infectional and post-infectional immunization. The conclusions which the author arrives at from his study may best be stated in his own words.

First all workers, save FERMI have failed to demonstrate a significant protective effect of vaccination following experimental exposure to rabies virus by any route. FERMI alone working with rats vaccinated them successfully against virus given subcutaneously provided at least 50 per cent. of their body weight of vaccine in multiple doses was employed. No one has confirmed this report. Second vaccine virulent or non-virulent, given before exposure has generally been found effective against test virus only under the following limited conditions: (a) the test virus must be given peripherally rather than centrally into the nervous tissue and in amounts fatal to less than 100 per cent. of controls, (b) the vaccine employed must be given in multiple doses and in large amounts, at least 1 per cent. of the body weight. Apparently FERMI was the first to offer convincing evidence of successful prophylactic vaccination and REMLINGER, STUART and KRIKORIAN, KELSEY and SHORTT (*et al*) presented ample confirmatory data. The results of experiments in general are irregular and show not only relatively meagre immunizing power of vaccines but little superiority of one preparation or procedure over another. The results of this survey of the literature led us to study the possibility of developing a quantitative and practical potency test with mice as the test animals.

In a second paper (very similar to that already reviewed in this *Bulletin* 1940 Vol. 37 p. 194) WEBSTER¹⁵ starting from the consideration that no quantitative or standardized method of testing vaccines has as yet been developed goes on to describe his mouse test and repeats the results which were summarized in my previous review. He concludes for his veterinary readers as follows:—

¹⁴ WEBSTER (Leslie T.) The Immunizing Potency of Antirabies Vaccines. A Critical Review—*Amer. J. Hyg.* 1939 Nov. Vol. 30 No. 3 Sect. B pp. 113-134 [23 refs.]

¹⁵ WEBSTER (Leslie T.) A Mouse Test for measuring the Immunizing Potency of Antirabies Vaccines—*Jl Amer. Vet. Med. Assoc.* 1940 Jan. Vol. 96 No. 754 pp. 65-73 With 1 chart.

We submit the mouse test as a practical, reliable measure of the immunizing potency of prophylactic vaccines for dogs and point out that this test has shown phenolized single injection, canine vaccines to be lacking in immunizing potency. Further studies on the administration of chloroformed vaccines in larger amounts and by different routes, plus studies on still different types of vaccines, are in progress with a view to developing if possible, an effective specific method for the prophylactic immunization of animals against rabies.

The question as to the most suitable vaccine to be employed for decentralized treatment in tropical climates is discussed by GIRARD and MILLIAU¹⁴. Experiments using the original vaccine of FERMI, the incubated phenol vaccine of SEMPLE, and the classic dried cord method yielded the following results. The vaccine of FERMI protected 16 out of 18 animals (88.8 per cent.) that of SEMPLE protected 11 out of 17 (64.7 per cent.) and dried cords protected 14 out of 18 (77 per cent.). The authors, in spite of the fact that these differences are quite insignificant (the greatest difference would be expected as the result of mere chance once in eleven trials) conclude that only the FERMI vaccine should be used in Madagascar and are met with the obvious difficulty that it must be stored in a refrigerator. Statistics from Madagascar are submitted to the League of Nations and the authors should be aware of the statistical reviews which have been published by that body. The results obtained there show no evidence of superiority of any one of those methods which they have employed, and their own experiment is in conformity with this conclusion.

On the occasion of the 50th anniversary of the Antirabic Institute at Rome PUKOTVI¹⁵ reviews its activities, with particular reference to the large degree of decentralization which now has taken place. The number of dispensaries has increased from 1 in 1923 to 36 in 1939.

The statistics of treatment at Kuala Lumpur for the year 1938 are detailed by LEWTHWAITE¹⁶.

17. Post Vaccinal Paralysis and Other Accidents

The case of a person who exhibited symptoms of syncope, vomiting, and loss of consciousness for a period of 2½ hours after inoculation with 5 per cent phenol vaccine is reported from Hanoi by BERNARD¹⁷.

A critical note on this case is presented by LÉPINE¹⁸ who states that this form of accident occurs more frequently with phenol than with other vaccines, and is inclined to the view that it is an anaphylactic phenomenon and not a phenol effect.

A somewhat similar case in which after the 11th injection the patient suddenly lost consciousness and suffered from a transient paresis is

¹⁴ GIRARD (G.) & MILLIAU (V.) Décentralisation du traitement antirabique et vaccins phénolés.—*Bull. Soc. Path. Exot.* 1940 Feb 14 Vol 33 No 2 pp 137-139.

¹⁵ PUKOTVI (V.) Cinquant'anni di attività dell'Istituto Antirabbico di Roma.—*Ann. d'Igiene* 1940 Jan Vol 50 No 1 pp 17-24.

¹⁶ FEDERATED MALAY STATES ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1938.—(Rabies pp 131-136 LEWTHWAITE (R.))

¹⁷ BERNARD (P.) Incident en cours de traitement antirabique.—*Bull. Soc. Path. Exot.* 1939 Oct 11 Vol 32 No 8 pp 799-800.

¹⁸ LÉPINE (P.) A propos des accidents syncopaux au cours du traitement antirabique.—*Bull. Soc. Path. Exot.* 1939 Oct 11 Vol 32 N 8 pp 800-802.

reported by NOURY²¹ from Morocco. He believes that the condition was due to arterial spasm and states that such sequelae were never observed after treatment by the dried cord method.

A similar statement is made by RAYNAL and LIEOU²² who describe the syndrome of symptoms which they have on rare occasions observed after treatment with phenol vaccines as being characterized by pain in the head, vertigo, syncope, cyanosis of the face, profuse sweating, stertorous breathing, tonic and clonic movements of the limbs and involuntary micturition. They believe these symptoms to be those of shock due to phenol. Experimentally they failed to reproduce the syndrome when inoculation was subcutaneous but when the intra-peritoneal path was used they have observed convulsive crises after two or three inoculations. They believe that the phenol is the responsible factor.

The prevalence of these phenomena is also discussed by BÉGUET and HORRENBERGER²³

v. Rabies in Animals

An interesting survey of the prevalence of rabies as judged by experimental inoculation amongst animals in Birmingham (Alabama U.S.A.) is reported by DENISON and LEACH²⁴. Of 352 dogs suspected of rabies 232 gave a positive result. Of 533 not suspected to be rabid 5 were positive (0.9 per cent.). Of a further 477 brought to the city incinerator by the dead wagon which died at home on the streets or were killed in traffic 25 (5.2 per cent.) were positive. The authors conclude that undiscovered or unsuspected rabies in dogs greatly exceeds the recorded incidence. A collateral examination of rats showed that of 500 trapped in various locations none were positive.

Two cases diagnosed as pseudorabies are described by FINKELSTEIN²⁵ one of a horse and one of a terrier.

vi. Miscellaneous

A general article on the diagnosis and control of rabies in South Africa is presented by THOMAS²⁷. He states *inter alia* that the introduction by WEBSTER and DAWSON of the white mouse as a test animal has caused an appreciable simplification of the work and what is

²¹ NOURY (M.) Un cas d'hémiplégie transitoire au cours du traitement antirabique par vaccin phéniqué.—*Bull Soc Path Exot.* 1940 Jan. 10 Vol. 33 No. 1 pp. 4-5

²² RAYNAL (J. H.) & LIEOU (Y. Ch.) Choc expérimental par solutions phéniquées faibles.—*C. R. Soc Biol.* 1940 Vol. 133 No. 2 pp. 242-244

²³ BÉGUET (M.) & HORRENBERGER (R.) Résultats d'une enquête sur les incidents observés au cours de la vaccination antirabique par le vaccin phéniqué.—*Bull Soc Path Exot.* 1940 Apr. 10 Vol. 33 No. 4 pp. 230-232.

²⁴ DENISON (George A.) & LEACH (Charles N.) Incidence of Rabies in Dogs and Rats as determined by Survey.—*Amer Jl Public Health.* 1940 Mar Vol. 30 No. 3 pp. 287-289 With 1 fig.

²⁵ DENISON (George A.) & DOWLING (J. D.) Rabies in Alabama. [Correspondence.]—*Jl Amer Med Assoc.* 1940 Jan. 6. Vol. 114 No. 1 pp. 78-77

²⁶ FINKELSTEIN (B. J.) Infectious Bulbar Paralysis (—Mad Itch).—*Jl Amer Vet. Med. Assoc.* 1940 Jan. Vol. 96 No. 754 pp. 89-100

²⁷ THOMAS (A. D.) Progress in the Diagnosis and Control of Rabies.—*South African Med Jl.* 1939 Nov. 23 Vol. 13 No. 22 pp. 763-765

more important a considerable shortening of the time taken to arrive at a positive as well as a negative diagnosis. After enumeration of the various animals which are known to be carriers of rabies in South Africa, he goes on to describe measures for controlling the epizootic.

During the course of propagating rabies virus in tissue culture, a strain of lymphocytic chorio-meningitis virus has been encountered by CASALS-ARIET and WEBSTER²². It grows readily on mouse embryo-serum-Tyrodé culture media and appears to have had its origin in the mouse brain or more probably the monkey serum. The identity of the virus was established by cross immunity and neutralization tests. Filtration tests gave clear cut results, and determined the size of the virus as 30 to 50 m μ .

KELLOGG²³ in a letter to the Editor of the *Journal of the American Medical Association* emphasizes the importance of cauterization.

A. G. McKendrick.

²² CASALS-ARIET (J.) & WEBSTER (L. T.) Characteristics of a Strain of Lymphocytic Choriomeningitis Virus encountered as a Contaminant in Tissue Cultures of Rabies Virus—*Jl Experim Med* 1940 Feb 1 Vol 71 No 2 pp 147-154 [10 refs]

²³ KELLOGG (W. H.) Treatment of Bites of Rabid Animals [Correspondence]—*Jl Amer Med Assoc* 1940 Mar 9 Vol 114 No 10, p 910

LEPROSY

PRÉCIS OF ABSTRACTS IN THIS SECTION

BRIDGERCLIFFE (p 624) estimates that in Nigeria the incidence of leprosy is 10 per 1 000. The voluntary system of segregation practised in Nigeria has been successful and the settlements are being increased as funds become available. DAVEY (p 625) urges further research in leprosy institutions and LANGAUER (p 625) shows that the survey-propaganda-treatment system has been successful in winning the confidence of the people.

In the Sandapet report (p 625) it is once more emphasized that contact with an open case affords the greatest risk of infection. In the village of Mambalam (p 625) where 28 definite cases were found in 1 103 persons, extra-familial infection was important but it is stated that the whole village may be regarded as a family group. AUSTIN (p 626) shows that in Fiji the distribution of cases depends essentially on the density of the population and has shown no material change since 1911. He stresses the importance of family contact examination. HOPKINS (p 626) discusses hereditary resistance to leprosy and considers that in Hawaii the rapid spread has been due to lack of this resistance in the natives.

GEHR (p. 626) discusses the sapotoxin-containing foods in relation to leprosy in New Zealand.

BOERJAMIA (p 627) gives information relating to the incidence of the disease and the condition of lepers in Batavia.

DOYLE and MEGRAIL (p 627) report the development of lesions in the Syrian hamster previously subjected to splenectomy and inoculated with leprosy bacilli.

In the Report of the Medical Research Council (p 628) is a suggestion by LAIDLAW that as material received from a human case in the Congo produced rapidly spreading lesions in rats the original infection may have been due to the rat leprosy bacillus and further that human leprosy in general may have arisen from rat leprosy the bacilli having become modified by adaptation to human tissues.

OTA and SATO (p 628) found results in hens inoculated with human or rat leprosy bacilli which indicated that multiplication had taken place together with more characteristic macroscopic and microscopic changes than are found in other experimental animals

DHARMENDRA and MUKHERJI (p 628) failed to find any attenuating action by methylene blue on the rat leprosy bacillus either *in vitro* or *in vivo*

ERMAKOVA (p 629) describes the histo-pathology of three types of simple lepid lesions of anaesthetic and maculo-anaesthetic leprosy REENSTIERNA (p 629) discusses the histological resemblance between cutaneous leprosy and the lesions of the Besnier Boeck and Schaumann diseases.

CONCEPCION *et al* (p 630) find that the blood ascorbic acid in leprosy is reduced in proportion to the severity of the disease.

MANALANG (p 630) advocates staining by the Cooper method in preference to the Ziehl-Neelsen in suspicious cases since 28 per cent more positives are given by the former

RODRIGUEZ *et al* (p 630) describe three cases in which lepromatous changes occurred in lesions of the macular type.

WADE *et al* (p 631) describe the clinical features and course of tuberculoid leprosy showing that there is no fundamental type differentiation between the major tuberculoid lesions and those of the lesser forms of neuromacular leprosy Spread may occur by extension and not necessarily by metastasis but there may be a secondary eruption papular or macular which is apparently due to metastatic dissemination The frequent persistence of bacilli in the tuberculoid lesions and the frequent relapses render the ultimate prognosis uncertain STEIN (p 631) states that tuberculoid lesions are the expression of a peculiar allergic condition accompanied by strongly developed immunity

FERNANDEZ (p 632) states that with the lepromin test there is an allergic reaction which may be seen after 48 hours as well as the late result in the third or fourth week. In 95 per cent of cases the early and the late reactions agree LARA (p 632) shows that the lepromin test may be positive in children under one year of age but some of these positive results may be the result of previous negative tests Early leprotic lesions in the children were associated with undiminished tendency to react positively and the duration and constancy of exposure to infection appeared to bear a direct relation to the proportion of positive reactions. MOISER (p 633) reports on the potassium iodide test in leprosy

PUPO (p 633) discusses the classification of leprosy

MOISER (p 633) obtained the best results in the treatment of leprosy over a period of 10 years, with Moogrol. MONTEL (p 634) describes a method of treatment with methylene blue combined with ozonized oxygen administration ZANETTI (p 634) recounts the results obtained with Neo-solganal, and DE GOLOVINE (p 634) reports favourably on another gold preparation Auro-detoxin.

HOU (p. 635) shows that in leprosy the urinary excretion of vitamin B₁ is far below normal but may be raised by oral administration. He therefore advises that vitamin B₁ should be given especially in cases where neuritis is present.

GERMOND (p. 635) uses Fouadin for the treatment of lepra reactions and has had success with drugs of the Protosol group for the same purpose.

COCHRANE (p. 635) describes the treatment used by him for trophic ulcers. RYRIE (p. 636) refers to the excellent effect of dressings containing vitamin A on the ulcers of leprosy and gives details of the preparations he uses including shark liver oil.

DELAOTTE (p. 636) describes the measures taken against leprosy in the French colonies. These rely largely on isolation in institutions or in the homes, treatment especially with chaulmoogra preparations, and propaganda. In the Belgian Congo (p. 637) almost 15 000 lepers are isolated in leprosaria. BARRETO (p. 637) gives information about the national campaign against leprosy in Brazil. C IV

- i. MONKEY (T. D. F.) The Enugu Leprosy Conference.—*Leprosy Review* 1940 Apr Vol. 11 No. 2 pp 79-83
- ii. BRIERCLIFFE (Rupert) Leprosy in Nigeria.—*Ibid* pp 84-89
- iii. DAVEY (T. F.) Problems for Research Work in Leprosy Institutions.—*Ibid* pp 90-95
- iv. LANGAUER (L.) Leprosy in Benin and Warri Provinces of Nigeria.—*Ibid* pp 96-99

This conference of Nigerian Leprosy workers from 14 settlements was held in August 1939 with the help of the Nigerian Government and of the British Empire Leprosy Relief Association, who were represented by Dr E. Muir and appears to have been a great success.

i. Dr Monkey spoke on difficulties and needs of the work.
 ii. Sir Rupert Briercliffe, Director of the Nigerian Medical Service gave an instructive account of the magnitude and difficulties of the leprosy campaign in that country. The number of lepers, some 200,000 at least 10 per mille of the population, was probably only exceeded in numbers by those of India and China. A leprosy ordinance of 1916 was practically a dead letter and real progress in tackling the problem began about 1928 with the work of Dr Macdonald at Iru, and with the visit of the secretary of B.E.L.R.A. Dr Muir's first visit in 1936 led to further advances regarding this major public health problem. Both the administrative and medical sections of the government have done all they could to help the government annual grant being £5 000 and there are now 14 settlements in the 23 provinces.

The success of the voluntary system of segregation as practised in Nigeria is evidenced by the constantly increasing demand for admission to the settlements. "The number of inmates has increased from 2,500 ten years ago to nearly 7 000 and would be much larger if money was available. The annual cost per case in the settlements varies from about £3 to £5 and depends on its size and the extent to which it has become self-supporting through the agricultural and other work of the patients. Twelve Toc H workers are employed in the colonies which are mostly under administration of medical missionaries. Valuable surveys are being carried out together with propaganda and treatment. The taxation per annum per head of population only amounts to 5s. 10d and nearly 4 per cent. of medical and health

expenditure is on leprosy, the total expenditure by Government and the Native Administration having risen from less than £8 000 in 1928 to nearly £20 000 in 1938 but even this is only about 2s. per head of cases. The fight will be a long one but good progress is being made.

iii Dr T F Davey spoke on research work in leprosy institutions. He urged further clinical studies and laboratory investigations to decide which cases are dangerously infective, especially those with diffuse bacillary invasion of the skin. The lepromin test may also be of use but it has not yet been tried in Nigeria. Periodic variations in resistance according to the seasons of the year might be investigated by means of the sedimentation test. Diet in leprosy is also important.

iv Dr Langauer deals with the difficulties met with in starting the Ossimo settlement in Nigeria. It took time to win the confidence of the people but this was gradually overcome through the survey-propaganda treatment method and now some cases have to be refused admission. There are 62 paying patients and the total number is expected soon to rise to 500.

Unanimous resolutions of the conference emphasized the following points. Open cases constitute the greatest danger and healthy persons especially children should be saved from contact with them. Surveys are only desirable if associated with offers of treatment. Research is required into what comprises individual resistance to the disease. The education department should arrange for instruction on leprosy including visits to leper colonies.

L Rogers

SAIDAPET HEALTH PROJECT. THE SECOND PROGRESS REPORT 1939 Aug pp 16-23 With 1 fig.—Report of the Silver Jubilee Clinic for the Study of Child Leprosy

This clinic started by Dr Cochrane is becoming increasingly popular. The results are shown in tables and a survey brings out the importance of contact with open cases as affording the greatest risk of infection. Benign forms tend to become spontaneously arrested. The addition of skimmed milk to the diet of the children had little effect on early lesions but may be beneficial in lepromatous cases. Maximum doses of hydnocarpus oil appeared to cause more rapid improvement. In one village survey every definite case was shown to have had contact with an open case.

L R

SAIDAPET HEALTH PROJECT. THE SECOND PROGRESS REPORT 1939 Aug pp 24-29 With 1 plan.—Preliminary Report of the Leprosy Survey of the Mambalam Village. May, 1939

This is a survey of a small slum village peopled by a single community of the depressed coolie class with poor economic conditions. Among 1 103 persons examined 28 definite cases of leprosy were found and 13 doubtful ones. As usual males suffered twice as much as females. It was in this village that new cases were regularly traced to contact with open ones and 14 were traced to two deceased open cases and 6 to existing open ones. In the majority the source of infection was extra-familial, although this is contrary to other findings at this clinic in which room contact was more important. The explanation appears to be that in this single community the whole village can be taken as a family group.

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L. R.

MEDICAL RESEARCH COUNCIL. REPORT OF THE MEDICAL RESEARCH COUNCIL FOR THE YEAR 1933-1939 [BALFOUR OF BURLEIGH, Chairman Cmd. 6163 [Leptosis pp 43-44]

In this section reference is made to the work of Sir Patrick LAIDLAW. Human leprosy material from the Belgian Congo had been inoculated by DUBOIS in Antwerp into Syrian hamsters. One of the hamsters became infected and LAIDLAW working with material from it, found that a rapidly spreading infection could be transferred with ease not only to hamsters but also to white rats. This fact together with observations made on the tissues of the animals suggested to LAIDLAW that the lesions from which the material was originally obtained were due to infection with the organism of rat leprosy and not to the usual human type an opinion shared by DUBOIS and by ADLER to whom specimens were sent. The clinical condition in the patient from whom the material was obtained had apparently aroused no suspicion of origin from the rat leprosy bacillus.

The question naturally arises whether human leprosy in general, may have originated by infection from the more rapidly spreading and more widely prevalent rat disease the bacilli subsequently losing their pathogenicity for the rat with adaptation to the human tissues. [See also this Bulletin 1939 Vol 35 p 293] C IV

OTA (Masao) & SATO (Saburo) Inoculation Experiments of Human and Rat Leprosy in the Hen.—*Internal J Leprosy* Manila. 1940 Jan-Mar Vol. 8. No. 1 pp 61-85

The results of inoculations with rat and human leprosy bacilli into hens, killed after six to eight months, are recorded. The injections were made into the breast muscles, in which after death were found yellowish circumscribed indurations up to the size of a sparrow's egg. Histologically these showed "colossal" numbers of acid-fast bacilli, which could not be cultivated on media favourable to tubercle bacilli. Granulation tissue, epithelioid cells and large lepra cells filled with bacilli, and also containing fat globules, were found. It was too early for generalization but a few bacilli were found in the liver and spleen in some animals. The lesions were very similar after both rat and human bacillary injections, and the authors consider that multiplication of the organisms had occurred, together with more characteristic macroscopic and microscopic changes than in other experimental animals. L R

DHARMENDRA & MUKHERJI (N N) Action of Methylene Blue on *Mycobacterium leprae* mutants.—*Indian J Med Res* 1940 Jan Vol 27 No 3 pp 627-630

The authors conclude from their tests that *in vitro* methylene blue has no attenuating effect on *Mycobacterium leprae* mutants so they were unable to confirm BERRY's findings. Nor did the stain have any action on the acid fast property of the bacilli. *In vivo* equally negative results were obtained, contrary to the findings of MARCHOUX and CHORISSE. [See this Bulletin 1935 Vol 32 p 548] L. R.

ERMAKOVA (N) The Histopathology of Simple Leproids—*Internat J Leprosy* Manila 1939 Oct-Dec. Vol. 7 No 4 pp 495-508 With 8 figs on 2 plates.

This is a detailed description illustrated by two plates of the microscopic appearances of three types of simple leprid lesions of anaesthetic and maculo-anaesthetic leprosy.

(a) Anaesthetic (nonmacular polyneuritic) symbol Na. Five cases of this group showed analgesia limited to the macules which microscopically did not differ from banal chronic inflammation. Lymphoid cells mixed with epithelioid cells were found accumulated around cutaneous blood vessels and especially around nerve branches in a muff like arrangement with destruction of the elastic tissue. The bacilli were mainly found in the nerve branches.

(b) Flat pale (depigmented) macules. Fifteen cases in this group showed polyneuritis with loss of all kinds of sensation in addition to macules. Inflammatory changes were found along the course of the nerves and blood vessels consisting of round cells and a few epithelioid cells with some fibrosis of the nerves which contained granular and bipolar staining bacilli.

(c) Tuberculoid macular (minor and major) symbol Nt. Four cases in this group showed well marked disturbance of sensation in the macules. Microscopically perivascular and perineural round cell accumulations with an admixture of epithelioid ones but no giant cells were found, with no tendency to form separate foci or cords. *Leptra* bacilli were concentrated in the nerves. The skin showed an atrophic condition and fibrosis and cicatricial changes were present in the nerves. The whole series of cases therefore revealed a banal chronic inflammation with clinical manifestations of simple leprids and polyneuritis. L R

OBERDÖRFFER (Manfred) Histologische Untersuchungen an *Leptra* flecken in Nigeria. [Histology of *Leptra* Macules.]—*Arch f Schiffs u Trop Hyg* 1939 Sept Vol. 43 No 9 pp 403-409 With 4 figs.

From a study of eighteen cases the author concludes 1 Anaesthetic bacteriologically negative lesions in leprosy in Nigeria constantly show tuberculoid changes. 2. In three lepromatous cases transition from the tuberculoid tissue reaction was met with. L R

REERNSTIERMA (J) Du rôle possible de la lèpre dans l'étiologie des sarcoides de Besnier Boeck et dans l'étiologie de la maladie de Schaumann. [Leprosy in Relation to Besnier-Boeck's and Schaumann's Diseases.]—*Acta Med Scandinavica* 1940 Vol. 103 No 1-2. pp 118-122.

The author concludes from a short discussion of this subject that the cutaneous lesions of leprosy may resemble histologically lupus pernio of Besnier the cutaneous sarcoids of Boeck and erythroderma of Schaumann. It has not been demonstrated that the micro-organism of leprosy is able to produce the reactions of the reticulo-endothelial system that constitute Schaumann's disease. L R

DENECKE (Karl) Ergebnisse bei der Untersuchung Leprakranker
[Research on Leprosy]—*Arch. f Hyg u. Bakt.* 1940 Vol. 124
No 1 pp 33-45

The author reports his observations on 49 leprosy cases in Negroes of Spanish West Africa. They include a clinical analysis, blood counts, the formol-gel and Rubino reactions and the histamine test, but they reveal nothing novel. L. R.

Ross (Hilar) Basal Metabolism in Leprosy—*Internat J. Leprosy*
Manila 1940 Jan-Mar Vol 8 No 1 pp 63-69

CHEW (B) Trigeminal Pain due to Leprosy—*Brit Med J* 1940
Feb 3 p 172 With 1 fig

DHARMENDRA & CHATTERJI (S. N.) Leprosy and Dermal Leish-
maniasis.—*Leprosy in India* 1940 Jan Vol 12 No. 1
pp 4-10 With 9 figs on 4 plates

The authors report three patients sent for the treatment of leprosy in whom only dermal leishmaniasis was found, and one of the opposite mistake. Good photographs are included. L. R.

FERNANDEZ (José M. M.) The Early Reaction Induced by Lepromin.—
Internat J. Leprosy Manila 1940 Jan-Mar Vol 8 No. 1
pp 1-14 With 16 figs on 3 plates [11 refs]

The author brings evidence to show that the value of the lepromin test is not only in the definitive reading between the third and the fourth week after the inoculation, but that the early reaction from a few hours after injection to its maximum between 49 and 72 hours is also of significance and is allergic in nature. Clinically it appears as a usually infiltrated erythematous halo, and is only seen in the resistant neural and tuberculous forms, and not in lepromatous cases. In 95 per cent of cases the early reaction coincides with the late third week nodular reaction. The two reactions are probably produced by different toxins of Hansen's bacillus, for a filtrate of lepromin always gives the early reaction in allergic cases, but only exceptionally a faint late reaction. Very similar reactions with tuberculin indicate that Hansen's bacillus contains soluble toxins separable from the bacilli, and insoluble ones that cannot be dissociated. The early lepromin reaction resembles clinically and histologically the Mantoux reaction, but in a group of lepers and contacts the reactions with both did not agree in 45 per cent of the cases. The naked eye and histological changes in the reactions are illustrated. L. R.

LARA (C B) Mitsuda's Skin Reaction (Lepromin Test) in Children of Leprous Parents. II. Observations on Newly-born to Eighteen-Month-Old Children.—*Internat J. Leprosy* Manila 1940
Jan-Mar Vol 8 No. 1 pp 15-28

The tests on 110 young children, from the newly born up to eighteen months reported on in this paper were carried out with a view to correlating the results of the lepromin test with the onset and later development of leprosy in children over a period of twenty months. Earlier statements that the lepromin test is constantly negative in

children under one year of age were not borne out for a few gave definite reactions and they could be induced in most of the children by repeating the test every four months. The frequency of positive reactions however increased with age but the proportion of reactors was probably in part the result of retestings for the majority of children under one year reacted on the second or third test. The appearance or existence of early leprotic lesions in the children was associated with an apparently undiminished and possibly even greater tendency to react positively. Both the duration and constancy of exposure to leprous environment seemed to bear a direct relation to the proportion of positive reactions. Intercurrent disease not of a serious nature showed no depressing influence on the reaction

L R

MOISER (B) The Potassium Iodide Test in Leprosy—*Leprosy Review* 1940 Apr Vol 11 No 2 pp 99-101

With the encouragement of the originator of the method, E Murr the author tested the reactions of arrested cases, before their discharge to large doses of potassium iodide and contrary to an earlier experience he met with no dangerously severe reactions in forty cases. They have now all been discharged apparently cured. During ten years experience in the favourable climate of Southern Rhodesia 53.9 per cent of his admissions have been discharged and have not returned.

L R

PUPO (J Aguiar) Das formas clinicas da lepra. Modalidades invasoras e reacionarias [Clinical Forms of Leprosy]—*Rev Brasileira Leprologia* S Paulo 1939 Dec. Vol 7 No 4 pp 357-390 With 1 folding chart & 18 figs. on 9 plates. English summary

This paper discusses the classification of leprosy cases. After referring to those of earlier authorities the author states that South American experience is in accordance with Jeanselme's three anatomico-clinical types rather than with those of the Cairo Conference. The paper includes good illustrations of the clinical and histological appearances.

L R

MOISER (B) Results of Treatment at the Ngomohuru Leprosy Hospital over a Period of Ten Years, 1929-1938.—*Internat J Leprosy* Manila. 1940 Jan-Mar Vol. 8 No 1 pp 69-70

This brief note tabulates the results obtained in the treatment of leprosy with various chaulmoogra preparations over a period of ten years. They confirm the author's impressions that Moogrol gave the best results with 26.5 per cent. of the patients discharged. Alepol which is more painful and Glycalepol gave 26.8 per cent. of discharges among 365 cases and Alepol, Antileprol and Iodized esters 18.8 per cent. Iodized esters showed 12.3 per cent of discharges. The average residence of patients before discharge as arrested was 20.3 months.

L R

RELAPSING FEVER.

PRÉCIS OF ABSTRACTS IN THIS SECTION

ORDMAN and JOXES (p 638) report that in an epidemic of relapsing fever in S Africa epistaxis with high fever was pathognomonic. They describe the clinical features and state that the mortality was 8 per cent. A single dose of 0.45 gm novarsenobillon at the height of the fever was usually successful in preventing relapse and the authors give information on the additional forms of treatment used.

BENTHAM (p 639) has studied the mouthparts and the feeding mechanism of *Ornithodoros*. DAVIS (p 639) reports the finding of infection in *Ornithodoros kerrisi* in Colorado where relapsing fever is endemic but where the vector has not hitherto been known. PHILIP and DAVIS (p 640) give data which suggest that *O. kerrisi* was the vector of relapsing fever in a cabin on Moscow mountain Idaho. DAVIS and WALKER (p 640) give an account of their observations on the feeding and moulting habits of *O. kerrisi* in relation to the acquisition and transmission of the spirochaetes of relapsing fever.

In the Belgian Congo BOWE (p 641) was not able to prove transmission by *Argas reflexus* or *R. sanguineus* although infection persisted in them for several months. C 17

ORDMAN (David) & JOXES (F R) Some Clinical Aspects of Tick Relapsing Fever in Natives in South Africa.—*South African Med. J* 1940 Feb 24 Vol 14 No 4 pp 81-83

Notes on the clinical aspects of an outbreak of tick relapsing fever among natives in the north-western part of Cape Province during 1936 to 1938. See this *Bulletin* 1940 Vol 37 p 188.)

The incubation period is uncertain but the interval elapsing between the first possible contact with ticks and admission to hospital ranged from 11 to 21 days. The principal symptoms noted were severe headache and pains in the limbs and occasionally the disease began with a rigor although rigors were generally uncommon. Abdominal symptoms were not observed on first admission but in relapses pain on the left side of the abdomen was frequently complained of.

On admission the temperature usually ranged from 102° to 105 F and congestion of the conjunctivae was almost always seen. Every case with epistaxis and high fever was later shown to be relapsing fever and epistaxis was pathognomonic of this epidemic. After about 12 hours of fever the temperature fell rapidly within 12 to 18 hours to 98-97°F accompanied by signs of shock and profuse sweating. Sometimes the fever lasted 3 to 4 days, but these cases may have been relapses.

After an interval of 4 to 7 days or longer from the first attack, in untreated cases there was a relapse which often lasted 3 to 4 days but occasionally only one day. In relapses there was nearly always a somewhat enlarged and tender spleen and sometimes jaundice was present. When a number of relapses occurred, in nearly all cases the liver was found to be slightly enlarged.

In untreated cases there was a tendency for various toxic degenerative processes to occur and haemorrhages were important complications. Nervous manifestations including loss of sphincter control were found in prolonged cases. A very common sequel was

rheumatic pains which persisted after the acute disease had apparently been cured.

The mortality rate was about 9 per cent in untreated cases and a fatal outcome was associated as a rule with debility heart failure pneumonia and acute intestinal infections. In chronic cases treatment after several relapses was not so satisfactory as in those diagnosed promptly and treated early.

The cases were usually treated with a single dose of 0.45 gm. Novarsenobillon given intravenously at the height of the fever and this was usually successful. In the small number that relapsed a second dose at the height of the fever prevented further relapses.

The use of Spirit ammon. aromat. 20 minims every two hours was found beneficial in combating shock in the initial pyrexia until the danger of collapse had passed. To relieve body pain sodium salicylate grains 10 (alone or with Spirit ammon. aromat. 10 minims) may be given when the danger of collapse is not imminent. In secondary attacks intravenous glucose solution was found of value in debilitated cases and in cases with respiratory complications. *E. Handle*

BERTRAM (D. S.) The Structure of the Capitulum in *Ornithodoros* a Contribution to the Study of the Feeding Mechanism in Ticks.—*Ann Trop Med & Parasit.* 1939 Dec. 30 Vol. 33 Nos 3 & 4 pp 229-253 With 22 figs [28 refs.]

Parasitologists will welcome this full and well illustrated account of the mouthparts and related structures of *Ornithodoros* a tick of great interest and importance. The paper shows that in most respects, *Ornithodoros* is very similar to *Argas* of which the anatomy was described many years ago by ROBINSON and DAVIDSON.

One part of the paper contains valuable new material and interpretation for the author has increased our knowledge of the relations and functions of the region at the base of the mouthparts. He attaches great importance to the tongue-like process which is thin walled and capable of expansion. Above it lies the opening of the salivary duct, below it the orifice of the pharynx. It seems that when the mammal's blood has passed into the tick's pharynx the tongue-like process acts as a valve and prevents regurgitation of blood when the pharyngeal muscles contract and drive the blood onward towards the midgut. The author also puts forward a reasonable theory to account for the entry of the saliva into the wound a point which has always been obscure for the saliva is poured out among the bases of the mouthparts.

The view put forward by SEN (1934-1935) that there is a median stylet perforated by a minute duct is gone into with care. Bertram is not able to support that interpretation. *P. A. Buxton*

DAVIS (Gordon E.) Relapsing Fever *Ornithodoros hermsi* a Vector in Colorado.—*Public Health Rep* 1939 Dec. 8 Vol. 54 No. 49 pp 2178-2180

A record of the discovery of *Ornithodoros hermsi* infected with spirochaetes in eastern Colorado.

Although the earliest known endemic focus of relapsing fever in the United States is in Colorado hitherto the method of transmission has remained uncertain. In September 1938 an extensive search was made in Park County a neighbourhood about 40 miles south west of

BONÉ (Georges) Contribution à l'étude de la transmission de la fièvre récurrente tropicale. (Deuxième mémoire) [A Contribution to the Study of the Transmission of Tropical Relapsing Fever (Second Memoir)]—*Ann Soc Belge de Méd Trop* 1939 Dec. 31 Vol 19 No 4 pp 477-484 [12 refs.]

A record of the results of attempts to transmit *Spirochaeta duttoni* by various ectoparasites other than *Ornithodoros*. *Argas reflexus* fed on infected mice and kept at 30°C. were found to contain virulent spirochaetes for at least seven months but all attempts to produce infection either by their bites or by the inoculation of coxal fluid were negative. The injection into mice of 25 larvae that hatched from eggs laid by such *Argas* also gave negative results.

Rhipicephalus sanguineus infected in the larval stage were negative in the nymphal stage but if these ticks were fed on infected mice in the nymphal stage the adults that emerged still contained virulent spirochaetes 3 months later.

In *Cimex lectularius* and *Melophagus ovinus* the spirochaetes were found to survive not more than 48 hours and neither was able to transmit the infection by bite [See also this *Bulletin* 1940 Vol 37 p 203] E H

BONÉ (Georges) Contribution à l'étude de la transmission de la fièvre récurrente tropicale [A Contribution to the Study of the Transmission of Tropical Relapsing Fever]—*Arch Internat Méd Expérim* 1939 Dec. Vol. 14 No 3 pp 137-173 [44 refs.]

See this *Bulletin* 1940 Vol 37 p 203

THAYER (Kent H) Relapsing Fever—*Southwestern Med* 1940 Apr Vol. 24 No 4 pp 125-127 [14 refs.]

RAT BITE FEVER.

PRÉCIS OF ABSTRACTS IN THIS SECTION

MORALES VILLAZON (p 641) found *Spirillum minus* in 25.5 per cent. of rats examined in Buenos Aires although only 2 human cases have hitherto been reported in S America. DUBOIS (p 642) shows that chicks hatched from eggs artificially inoculated with infected blood may themselves show *S. minus* in the blood. MANOUÉLIAN (p 642) describes infection of the tongue of rodents by *S. minus* and notes that in rats and mice sodoku develops without producing obvious symptoms except splenomegaly C W

MORALES VILLAZON (Nestor) Hallazgo del *Spirillum minus* en las ratas del Puerto de Buenos Aires. [Finding of *Spirillum minus* in Rats of the Port of Buenos Aires]—*Rev Inst. Bacteriológ* Buenos Aires. 1939 Dec. Vol. 9 No 2. pp 156-166 With 2 figs.

Search in the literature has revealed to the author only two human cases of rat bite fever in South America, one reported from Montevideo

In 1890 and one in the Hospital Mufiz, Buenos Aires, in 1894. He has tested a number of wild rats and inoculation of their brain tissue into 167 laboratory animals (Chanchitos) has given 34 positive results (20.3 per cent). [The number of rats examined is not clear unless we are to infer that one experimental animal only was inoculated from each rat.] The author concludes that Buenos Aires rats show a high index of infection. Cultivation of the spirillum was attempted repeatedly but without success. H H S

DUBOIS (A). Inoculation du *sodoku* à la poule et à l'embryon de poule. [The Inoculation of *Sodoku* into the Fowl and the Fowl Embryo.]—C. R. Soc. Biol. 1940 Vol. 133 No 1 pp. 100-102.

Eggs of fowls after 10 days incubation were inoculated with the blood of mice infected with *sodoku* and examined, usually 8 to 10 days later by dark ground illumination and also by the inoculation of the contents of the eggs into normal mice.

About 40 eggs were treated in this way and although the results of microscopical examination with one exception, were uniformly negative 6 out of 8 inoculations were positive. In three cases the chicks that hatched from such eggs contained the infection in their blood as demonstrated by inoculations into mice. These chicks died soon after hatching.

In the adult fowl the inoculation of *sodoku*, as shown by SCHOENKART produces no obvious or latent infection and the serum of such birds does not develop any new agglutination or similar properties. E H S

MANOUÉLIAN (Y). Le *sodoku* chez quelques muridés. [*Sodoku* in Various Rodents.]—C. R. Soc. Biol. 1940 Vol. 133 No 4 pp. 582-585 With 1 fig.

The author previously noted* that in rats and mice the spirillum of rat bite fever is attracted to the muscle fibres of the tongue and he now gives some further details. In silver preparations the organisms may be seen under the sarcolemma but they do not penetrate into the thickness of the muscle fibre.

The spirilla escape from the muscle fibres to the surface of the tongue owing to the fact that in certain regions, especially the tip of the tongue the muscles are covered only by a very thin epithelial layer which is easily broken.

In rats and mice *sodoku* develops without producing any obvious clinical symptoms, but the author finds that most of the animals show distinct splenomegaly. E H

LEWTHWAITE (R). Agglutination of *Proteus* in Rat Bite Fever (Correspondence.)—Lancet. 1940. Feb 24 p. 360.

A brief statement that Dr SAVOOR at the Institute for Medical Research, Kuala Lumpur F.M.S. found that the serum of rabbits inoculated with infected material from a case of rat bite fever agglutinated the OXK strain of *Proteus*. This finding was obtained once before at the Institute. E H

LEPTOSPIROSIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

BROWN (p. 643) describes a rapid macroscopic agglutination test for leptospirosis which is read by means of a hand lens. Although not so sensitive as the Schüffner method it is reliable enough to justify the administration of curative serum if positive and it can be read in 15 minutes. The tests carried out by KOLOCHINE ERBER and STEFANOPOULO (p. 643) on human sera in French Equatorial Africa indicate that leptospirosis is much more common than was previously suspected. The importance of using different strains of leptospira in the tests is emphasized.

RIZZOTTI (p. 644) reports leptospirosis in S Abyssinia especially in the highlands. MOCHTAR and COLLIER (p. 644) found considerable evidence of leptospirosis in dogs in Batavia. In reporting leptospirosis in French Guiana FLOCH *et al* (p. 645) point out that severe cases may be mistaken for yellow fever and that the high blood urea in leptospirosis is an important diagnostic point. C IV

BROWN (H. C.) A Rapid Presumptive Serological Test for Weil's Disease.—*Brit Med J* 1939 Dec. 16 pp 1183-1184 With 1 fig.

The author recommends a macroscopic technique for the rapid testing of serum for the presence of antibodies against *Leptospira icterohaemorrhagiae*.

The antigen for the test is prepared from heavy cultures of the leptospira in Fletcher's broth formalized to a concentration of 0.2 per cent. Saponin is then added up to a concentration of 1 in 1000 to facilitate sedimentation and the mixture centrifuged at high speed. The deposit of leptospira is collected and suspended in saline until its opacity approximates that of a No. 1 Wellcome opacity tube used for the standardization of vaccines. This antigen is then centrifuged at 3000 revolutions per minute for 10 minutes to remove any clumps of leptospira and the supernatant fluid is bottled for future use.

The test consists of mixing small quantities of varying dilutions of the patient's serum with equal quantities of the formalized suspension. The mixtures are rocked to and fro for 10 minutes either on a slide or in the depressions of a painter's palette and the result read by means of a hand lens against a dark background when any agglutination of the leptospirae is readily observed.

This method has been compared with Schüffner's agglutination technique but in every instance the latter gives a titre at least three times higher. With a suitable antigen the rocking-slide method produces a result within 15 minutes of the receipt of the serum and is reliable enough to justify the administration of curative serum.

E Handle

KOLOCHINE ERBER (B.) & STEFANOPOULO (G. J.) A propos d'une enquête sur les leptospiroses en Afrique Équatoriale Française. [An Inquiry into the Leptospiroses of French Equatorial Africa].—*Bull Soc. Path. Exot* 1939 Dec. 13 Vol. 32. No. 10 pp 919-923.

A record of the results of agglutination tests on 124 specimens of blood collected by Dr Stefanopoulo in French Equatorial Africa.

The sera had been kept *in vitro* for long periods, during which some of the sera may have lost their agglutinins, as these deteriorate with age. Ten sera from cases of jaundice at Ponto Noire French Congo were tested against the Verdun strain of *L. icterohaemorrhagiae* and all gave negative results.

Ninety-three sera from Brazzaville gave 16 feebly positive reactions against the same strain. Nine of these positive sera were tested against 8 other strains of *Leptospira* including 4 European strains of *L. icterohaemorrhagiae*, 2 Netherlands, Rachmat and Salinim and 2 water strains. The 4 European strains were all agglutinated more or less to the same titre but negative results were obtained with the other four strains.

Twenty-one other sera were tested against 17 strains, including in addition to 7 of those mentioned above, 3 Japanese strains (*antimurialis* A & B and *hebdomadis*), 6 strains of *L. canicola* and another water strain. The results are as follows:—Tchikounga, French Congo 7 sera 3 agglutinated the typical 3 strains of *L. icterohaemorrhagiae*; Moulla Gabon 6 sera 1 agglutinated the two Japanese strains *L. antimurialis* A & B and another these two and also the Rachmat strain. Port Gentil Gabon, 4 sera 3 agglutinated the typical European strains. Beach Gabon, 4 sera 3 agglutinated the typical European strains. These results suggest that leptospiroses are much more common in Equatorial Africa than previously suspected, and also show the necessity of making sero-diagnostic tests with different strains of *Leptospira*.
E H

RIZZOTTI (Giovanni). Note circa la presenza e la diffusione della malattia di Weil nelle regioni di Gardulla e Baco. [*Leptospirosis in Gardulla and Baco*].—*Riv di Biol Colon*. Rome. 1930 Aug Vol 2 No 4 pp 241-253 With 2 figs. (1 map) English summary (8 lines)

Notes are given of 71 cases of Weil's disease, which were under the author's observation in the period from June 1937 up to September 1939, in the regions of Baco and Gardulla (Southern Ethiopia).

The fact that the incidence of the disease in the two regions mentioned above appears greater below 1500 metres and decreases above that altitude is pointed out as being in relation with the different hydrological factors existing in the two regions.

The author communicates the native belief that the disease is spread by bats.

MOCHTAR (A) & COLLIER (W A). Het leptospira-onderzoek bij honden te Batavia [*Leptospira in Dogs in Batavia*].—*Nederl Indische Bladen v Diergeneesk* 1939 Dec Vol 51 No. 6 pp 339-346 [20 refs.] English summary (9 lines)

1 37.5 per cent of the sera from 152 dogs in Batavia gave a positive agglutination and lysin reaction with strains of *Leptospira* from different serological types.

2 22.4 per cent of the sera were positive with the *L. bataviae*.

3 By the investigation of 157 dogs, it was found that five animals harboured leptospires in their kidneys.

4 It was serologically determined, that four strains belonged to the group of *Leptospira bataviae* and one to the *L. pomona*.

5 Neither *L. canicola* nor the original type of Wijnberg were isolated.

FLOCH (H) GOERGER (F) & TASQUE (P) La spirochétose ictéro-hémorragique en Guyane Française [Ictero-haemorrhagic Spirochaetosis in French Guiana.]—*Bull Soc Path Exot* 1940 Jan 10 Vol. 33 No 1 pp 42-49 With 1 fig

A description of two cases of Weil's disease one fatal the first to be recorded in French Guiana They were identified by bacteriological and serological tests and also by autopsy of the fatal case There was evidence in support of the view that rats were responsible for both the infections

Severe cases of this disease are often mistaken for yellow fever and in the absence of bacteriological findings attention is drawn to the importance of the changes in the urine slight albuminuria and considerable uraemia [which the author refers to under urinary changes] being in favour of Weil's disease The estimation of blood urea is therefore of primary importance in cases of yellow fever

E H

MOCHTAR (A) & COLLIER (W A) De *Leptospira javanica* als een zelfstandige leptospira soort [Is *L. javanica* a Separate Species?]—*Geneesk Tijdschr v Nederl Indië* 1940 Jan 16 Vol 80 No. 3 pp 131-137

HELMINTHIASIS

PRECIS OF ABSTRACTS IN THIS SECTION

Ascaris infection etc.—SCOTT (p 647) shows that 80 per cent of the inhabitants of the Nile delta are infected with *Ascaris*. The infection is evenly spread but the intensity is not so high as in the family infections of other countries Transmission is by direct hand to mouth transfer of eggs which have developed on moist floors, and women and children therefore have more infection than men. MOMMA *et al* (p 648) report on hexylresorcinol in the treatment of *Ascaris* infection

BOTSFORD *et al* (p 648) report the association of appendicitis and *E. vermicularis* infection of the appendix in children. Symptoms of acute appendicitis may be produced by this infection even when after excision the appendix is found not to be inflamed. The two conditions cannot be clinically differentiated and the safest treatment is appendectomy SCHWARTZ and STRAUB (p 649) however emphasize the definite pathological conditions of the appendix caused by *Enterobius*. WRIGHT and BRADY (p 649) find that gentian violet is the best treatment for *Enterobius* infection and give details of the methods used. With BOZICEVICH they (p 649) give the results of other treatments tested.

GALLIARD (p 650) discusses the reasons for the observed rarity of infection of dogs in Tonking with *Strongyloides* since dogs are easily infected from human sources and the evidence available points to the identity of the canine and human forms.

Filariasis—YOKOGAWA and YAMOTO (p. 650) give figures of the incidence of filariasis in Isigaki Island. YOKOGAWA *et al* (p 651) have

found infection with *W. bancrofti* in the Peracadores. TOUMANOFF *et al* (p 651) show that infection with *Mf. malayi* is present in the highlands of Upper Tonking infected *Anopheles minimus* and *A. jayponensis* have been found.

KOBAYASHI (p 651) gives the results of a study of the structure of *Mf. bancrofti*. YOKOGAWA (p 652) adds a further note on the subject of the penetration of the skin by larvae of *W. bancrofti* from the proboscis of mosquitoes. He claims that the larvae do not penetrate the intact skin and rarely penetrate through the puncture caused by the mosquito bite if one or two of the deeper layers of the skin are intact.

IVENGAR (p 652) describes a method of preparing blood films which avoids distortion of microfilariae. He discusses the nomenclature of *Mf. malayi* suggesting that it be placed in the genus *Filaria* but LANE in comment cannot regard this as admissible and points out that the term *Microfilaria* is used as a clear and legitimate word covering the larval forms of any "filaria."

GORDON and LUMSDEN (p 653) have devised a method by which they have watched the mouth parts of *Aedes aegypti* during the process of taking up blood from the tissue of the web of frogs feet. The movements of the labrum were observed and it was found that an active and purposeful bending of the distal fifth took place which enabled the tip to enter a capillary though this result is apparently accidental, since the labrum may pass right through a capillary. Feeding may take place directly from a capillary or from a pool of blood in the tissues in which case it is slower. The frogs were infected with *Feltyella dolichoptera* the microfilariae of which were present in the blood and it was found that the stomachs of mosquitoes which had fed from capillaries contained more microfilariae than those of mosquitoes which had fed from pools of blood. The explanation suggested is partly that microfilariae are unevenly congregated in the capillaries and partly that microfilariae escape less readily than blood cells from the capillaries.

KNOTT (p 655) states that the primary lesion of filariasis is a sterile inflammatory reaction, which occludes the lymphatic vessel, about a dead worm. The lymphatics of the testis are especially vulnerable and lymph stasis in this region may be the only sign of the disease. He details the changes which may be found. Hydrocele is the most common filarial disorder to induce the patient to seek advice and the author indicates methods of treatment.

YOKOGAWA *et al* (p 655) show that Pandit's adhesion reaction in filariasis depends to some extent on the blood groups of the sera used.

KOPRA and RAO (p 656) found atabrin and plasmoquine to be ineffective in the treatment of filariasis but ionadin caused temporary reduction in the numbers of *Mf. bancrofti* in the blood and controlled the inflammation and fever for a comparatively long period of time. Seaman, though causing no diminution in the numbers of microfilariae was useful in controlling fever and inflammation.

MORALES (p 658) reports the sheathless and non-periodic *Mf. demareki* in the blood of patient in Bolivia.

BREYNOGHE (p 657) discusses LANE's hypothesis of daily birth and daily destruction of the larvae of *W. bancrofti* in the light of his own work with *D. immitis*. He reports work which shows that the introduction of adult *D. immitis* or the injection of microfilariae into the peritoneum of rabbits and guinea-pigs does not result in positive serological or skin tests. Antigen reactions therefore vary with the

host and perhaps with the parasite BROWN and AUSTIN (p 657) report that the trivalent antimony compound Stibsol has proved effective in sterilizing the blood of dogs infected with *Dirofilaria immitis* apparently by killing the mother worms

MIRA (p 658) reports *Simulium damnosum* in Abyssinia and advises a search for onchocerciasis there

GREIG (p 658) records the radiological appearances of apparently calcified *Loa loa* in human tissues.

LINDBERG (p 659) has found infection with embryos of *D. medineensis* only in *Mesocyclops vermicifer* in water tanks in the Deccan. He (p 659) gives a list of fish which are found in these tanks.

Trichinella infections etc—In a summary of trichiniasis in the *Journal of the American Medical Association* (p 659) it is stated that 18 per cent of diaphragms examined at post mortem in the U.S.A. show larvae ROTII (p 660) shows that a small infection with *T. spiralis* gives some immunity in guineapigs against a subsequent larger dose and that this immunity is due to an intestinal defensive mechanism. LICHTERMAN and KLEEMAN (p 660) show that the intradermal test for trichiniasis in pigs results in an error of less than 3 per cent in diagnosis

SWARTZWELDER (p 660) describes the symptoms present in 81 uncomplicated cases of infection with *Trichuris trichiura* MAPLESTONE and MUKERJI (p 661) find that the forms of iron commonly used in the treatment of anaemia are of no value in the treatment of *Trichuris* infection. The value of D.C.F. and of the Stoll technique in diagnosis is discussed.

SKRJABIN (p 662) describes human infection with *Thomina acrophilus* a nematode of the family Trichocephalidae which is usually found in the lungs, trachea and nasal cavities of carnivorous animals. Eggs were present in the sputum

C IV

SCOTT (J Allen) Observations on Infection with the Common Roundworm, *Ascaris lumbricoides* In Egypt.—*Amer J Hyg* 1939 Nov Vol 30 No 3 Sect D pp 83-116 With 7 maps & 3 graphs. [32 refs.]

That the conditions of infection with *Ascaris lumbricoides* in Egypt are in many respects unique has been shown by studies based on an analysis of over two million examinations in government treatment centers on nearly 40 000 egg counts made under the author's supervision as well as on numerous soil isolations and other studies of local conditions. In all, about six million of the fifteen million people are infected. In the Nile valley only about 20 per cent. of the rural people are infected but in the delta the average prevalence is about 80 per cent. Even in the latter district the average number of worms harbored is low as compared with most countries while, where the prevalence is low the intensity is below that recorded for any other endemic area. In regions of low prevalence in most countries the infections are concentrated in a few families and therefore the intensity in the infected persons is as high as where the prevalence is high. In Egypt however the infection is evenly spread through all of the families of the compactly built villages, with the result that over the country as a whole the intensity is directly proportional to the prevalence. In spite of the lack of concentration in families the infection is transmitted primarily by direct hand-to-mouth transfer of eggs which have developed on the moist floors and thus the women and children tend to have more infection than the men.

Diagnosis was by the NIH cellophane swab used if possible on seven consecutive days. As to treatment these were the results. Santonin was given to 20 in one daily dose for 10 days 9 were still positive. Enemas of hexylresorcinol, 1 in 2,000 in water were given in varying numbers to 27 and 18 became negative the minimum number for success is 10 spread over three weeks. Hexylresorcinol by mouth, as caprokol pills repeated weekly after three weeks, left 3 of 4 patients infected. One ounce of 1 in 1,000 caprokol jelly put in the rectum at bedtime left 8 of 8 patients infected. Non-medicated soap or saline enemas may be satisfactory in infants and young children if given every other night for not less than three or four weeks, but the course has often to be much longer. Anal ointments are of little or no use in unworming. C. L.

GALLIARD (Henri) Recherches sur la Strongyloïdose au Tonkin. Rôle des animaux domestiques dans l'étiologie de l'infestation humaine [Infection by Strongyloides in Tonking. Domestic Animals and Infection in Man.]—*Ann de l'Ecole Supérieure de Méd et de Pharm. Indochine* 1938. Vol 2. PP 104-112. With 4 figs on 2 plates. [13 refs]

Strongyloides infection is not simple as is that of hookworm, and has further surprises for us.

Although, in Tonking Strongyloides infection is exceptional in dogs and cats, these are very readily infected from human sources and the effects are very serious and often mortal in young animals, even within 12 days in a massive skin infection while after infection the female parasites may live and pass larvae for 4 months moreover other dogs in contact with those infected from man become themselves infected. The rarity of reported natural infection in the dog is explicable either as a result of little exposure to such infection or to lack of investigation. Galliard's local experiments show that in dogs infected from man both direct and indirect cycles of development occur at first but as passage succeeds passage through dog only the indirect cycle persists, that is to say a free living adult stage becomes necessary. All this points to an identity of the canine and human forms and adds to the mystery of the rarity of natural infection in the dog. C. L.

LAWLER (Harry J.) Passive Transfer of Immunity to the Hematode *Strongyloides ratti*—*Amer J Hyg* 1940 Mar Vol 31 No 2 Sect D PP 23-31

YOKOGAWA (Sadamu) & YUMOTO (Yosuka) Investigations on the Incidence of Filariasis in Ishigaki Island, Okinawa Prefecture.—*Acta Japonica Med Trop Formosa* 1939 May Vol 1 No 1 PP 18-23.

Of a population of 4,040 the night blood of 569 was examined, 0.1% being taken from the ear of each on four slides. The displayed infection rate averaged 23.47 (21.88 to 35.55) in different groups. As graded by microfilaria counts the weights of infection among those in whom infections were displayed were—1 to 10 microfilariae in this amount of blood 41.36 per cent 11 to 100 30.2% per cent 101 to 500 22.22 per cent over 500 6.17 per cent. Figures for locality, sex and age are given. C. L.

YOKOGAWA (Sadamu) KOBAYASI (Hidekazu) YUMOTO (Yosika) OSABA (Kiyosi) RO (Mantoku) & YOKOGAWA (Muneo) Epidemiological Investigations on *Wuchereria bancrofti* in the Hôko Islands (Pescadores)—*Taiwan Igakkai Zasshi* (Jl Med Assoc Formosa) 1939 Oct Vol. 38 No 10 [In Japanese pp 1452-1464 With 1 map English summary pp 1465-1466]

It seems to have been believed that filariasis was not present in these islands but a report that it was led to investigation by this team in the summer of 1938.

Blood was examined at night from it seems over 2 000 children. Infection rates in different islands varied from 0.85 to 11.22. Most of the infections were very light (1 to 10 microfilariae in 0.1 cc. of night blood is the standard adopted) or light (11 to 100 microfilariae). Further statistics of local interest are given. *Culex fatigans* is common. 1 of 29 female specimens contained infective larvae believed evidently to be those of *W. bancrofti*. C. L.

TOUMANOFF (C) TRY (H. T.) & CHANG (T. L.) Au sujet de l'existence de *Filaria Malayi* et *F. bancrofti* dans la Haute Région tonkinoise et du rôle probable des diverses espèces culicidiennes dans la transmission de la filariose humaine. [The Frequency and Transmission of Filariasis in Upper Tonking]—*Rev. Méd. Française d'Extrême-Orient* 1939 Aug-Sept No 7 pp 871-876.

The night blood of prisoners at Hagiang and at Laokay in upper Tonking and at Tuyên-Quang in middle Tonking gave these microfilarial percentages. Hagiang 223 prisoners, *Mf. bancrofti* 4.48 per cent and *Mf. malayi* 6.72 per cent. Laokay 142 3.52 and 4.22. Tuyên-Quang 51 prisoners *Mf. bancrofti* 11.16 *Mf. malayi* 0. *Mf. malayi* is then present in the highlands and there dissection of 1 830 *A. minimus* has shown 3 filarial infections. Other figures are mostly vague but between 1931 and 1938 this mosquito was found infected (usually in the proboscis) 21 times 16 of them being at Hagiang where 3 infections were found in *A. jeyporiensis*. Agam *A. minimus* contained human blood in 93 and *A. jeyporiensis* in 97 per cent of collections at Hagiang. Comparison is made with Jackson's work at Hong Kong [see this *Bulletin* 1937 Vol. 34 p 459]. C. L.

KOBAYASI (Hidekazu) Supplementary Study regarding the Organisation of *Microfilaria bancrofti*—*Acta Japonica Med Trop* Formosa. 1939 Dec. Vol. 1 No 2. pp 193-202. With 2 plates. [23 refs.]

A modified staining method using Giemsa's dye was successfully employed which gave better results than those previously used. There are 4 primordial cell groups besides the excretory and G-cells in the nuclear column which lie along the longitudinal axis of the microfilaria. (a) The primordial cells of the anterior oesophagus consist of 2 cells situated anteriorly to the nerve ring. (b) The primordial cell group of the posterior oesophagus is situated at about the centre of the microfilaria and consists of several cells arranged chiefly in a short oval form. (c) The primordial cell group of the posterior oesophagus consist of several cells arranged in a short oval form or in 2 columns of cell rods. (d) The genital anlage is situated at the ventral side near the primordial cells of the posterior

oesophagus and mid-intestine at a point varying from 30.54-53.19 per cent average 45.83 per cent from the head of the larva and has no relationship with the G cells.

YOKOGAWA (S) Transmission of *W bancrofti* [Correspondence].—*Trans Roy Soc. Trop Med & Hyg* 1939 Nov 25 Vol. 33 No. 3. pp 363-364.

In continuation of an earlier paper [this *Bulletin* 1939 Vol. 36 p 836] Yokogawa reports that mature larvae were dissected from mosquitoes in normal saline and placed on the skin of 6 volunteers the author among them, and on that of mice rendered hairless by "Eva cream" they died without penetrating. Mature larvae "set free from the proboscis of infected mosquitoes on to the surface of the skin of mice" have longer some entered the puncture caused by the mosquito bite but it seems that if even only one or two of the deeper layers of the skin were intact they rarely penetrated. After entering the skin through the puncture wound they migrate not only along the lymphatic spaces but also indiscriminately in the tissues, and in mice they become degenerate and enveloped by fibroblasts within 15 hours of the infecting bite. Of five volunteers bitten by infected mosquitoes in one case 82 days after the infection and in another case 111 days after a first and 56 days after a second infection, two microfilariae were recovered from 2.0 cc. of blood examined at night and thereafter no more in night examinations over several weeks. "The author is of opinion that the larvae may become adult and produce microfilariae in 20-30 days after the infection."

"Microfilariae will, however find difficulty in entering the peripheral blood, because they are liable to be retained by the reticulo-endothelial system of the host, before it is completely blocked. Consequently it is believed that the periodicity of microfilariae is chiefly controlled by diurnal and nocturnal alteration in the physiological function of the reticulo-endothelial system."

[Did the experiments on man take place in a non-endemic area and on persons who had never been out of such an area?] C L

IYENGAR (M O T) Differentiation of Microfilariae of *Wuchereria bancrofti* and *Filaria malayi*.—*Indian J. Med Res* 1939, Oct. Vol. 27 No. 2 pp 563-571 With 6 plates. [14 refs.]

A well figured contrast of the shape size and structure of *Mf bancrofti* and *Mf malayi*.

To avoid distortion and shrinkage on drying of the blood film the following method is advised —

A drop of blood from a carrier is taken on a slide and mixed with a drop of normal saline. One or two small crystals of menthol are placed in the blood and the slide left in a moist chamber. When all the microfilariae have been fully narcotised (which usually takes about half an hour) and are in a well-extended condition, the menthol crystals are removed and the blood spread out to form a smear and then quickly dried. The smear is then placed in water to dissolve out the haemoglobin, fixed with Eile's solution, stained with haematoxylin, and counterstained with eosin."

Mf acumi and the atypical form of *Mf bancrofti* of Koorke (1929) are classed as synonyms of *Mf malayi*. As to the nomenclature, this sentence occurs —

In an editorial note in the *Ind Med Ga.* 1937 Vol. 72 p 734 an opinion was expressed that it was inadmissible to place this species under the genus *Filaria* as it had been described only from the larval form, and it was suggested that it should be termed *Microfilaria malayi*. The term *Microfilaria* is not a systematic unit and is therefore not a genus (*vide* Baylis and Daubney 1926). Like the term *Agamofilaria* it is only a collective group meant for the sake of convenience to accommodate species of *Filaridae* described from larval forms in cases where the authors are doubtful of the generic position. Since however the author of the species *Filaria malayi* had placed it under the genus *Filaria* there is no justification now for changing the name to *Microfilaria malayi* merely because it was described from the larval form.

[The matter is less simple than this. As Article 30 of the Code of Zoological Nomenclature suggests every genus must have a type species and if the original name of the genus did not designate this it is open to someone else to do so. When MÜLLER named the genus *Filaria* in 1787 he gave it no type species. This omission was rectified by STILES and HASSALL in 1905 and *Filaria maris* Gmelin 1790 was designated by them as type species. To use the term *Filaria malayi* implies then a conviction that the parent worms fall morphologically within the same genus as *F. maris* but the parent worms of this microfilaria are unknown and quite certainly cannot with confidence be placed in the same genus as *F. maris*. That BRUG used the term *Filaria malayi* is then not binding in zoological nomenclature. In 1913 the International Commission on Zoological Nomenclature made this Recommendation regarding Article 8 of the Code. Certain biological groups which have been proposed distinctly as collective groups not as systematic units may be treated for convenience as if they were genera but they require no type species. Examples *Agamodistomum* *Sparganum*. The worm *Microfilaria* is not used to cover a systematic unit, but provides medical men with a convenient clear and legitimate word to cover these larval filarial worms among which without overstrain *W. malayi* falls.] C L

GORDON (R. M.) & LUMSDEN (W. H. R.) A Study of the Behaviour of the Mouth-Parts of Mosquitoes when taking up Blood from Living Tissue, together with Some Observations on the Ingestion of Microfilariae—*Ann Trop Med & Parasit* 1939 Dec. 30 Vol. 33 Nos. 3 & 4 pp 259-278. With 13 figs [17 refs.]

By ingenious apparatus and after an appetizer of human blood, the feeding of mosquitoes on the web of frogs whose blood contained microfilariae has been watched under the microscope. The results are illuminating.

The frog *Rana sphenoccephala* the North American leopard frog was naturally infected with *Foleyella dolichoptera* the adults living in the retroperitoneal space the microfilariae circulating in the blood. Suitable specimens were those with the least skin pigment. The mosquitoes were the females of *Aedes aegypti* fed for several days on raisin and starved for 48 hours but even then they could not be induced to feed on frog unless they were given 30 seconds on man and then at once transferred to frog when 34 of 100 did so. However this subterfuge was not effective in getting any *Anopheles maculipennis atroparvus* or *Culex molestus* to bite frog. The apparatus clearly illustrated consists of the means of bringing together under the microscope the frog's web and the mosquito. The web was stretched

by tapes attached to clips on the frog's toes the mosquito was put in a bulbous observation tube, the bulb having a window covered with mosquito netting this window being brought up against the under side of the stretched web and the process watched from above with a $1\frac{1}{2}$ inch or a $\frac{3}{4}$ inch objective and $\times 5$ or $\times 10$ eyepiece respectively. After describing the observed preliminaries to penetration of the fascicle past the frog's skin and noting that after penetration the mandibles could not be identified, the movements by which the labrum and maxillae move through the tissues are detailed. No author it is noted, has referred to the marked active and purposive bending of the distal fifth of the labrum a searching movement and along the track it makes the rest of the labrum curves passively. The fascicle is not driven vertically into the tissues but its tip turns towards the horizontal and enters a capillary. This entry seems to be accidental, for the fascicle may pass right through a capillary.

Feeding is of two kinds. There is capillary feeding when the fascicle takes blood direct from the lumen of a capillary. The latter pool feeding when, after the fascicle is withdrawn from a capillary blood escapes into and forms a pool in the tissues, constantly replenished by a fresh outflow of blood, which is taken up by the insect. The former feeding takes about 3 times as long to effect engorgement of the stomach as the former—ten minutes at against three. It is thought that salivary secretion may as AUGUSTINE FIELD and DANKER reported [this Bulletin 1937 Vol 34 p 35] hold their positions in capillaries by pressing their convolutions against the wall, though they were not observed to progress against the stream, but the speed with which blood was taken up from a capillary precluded study of details. The great variations in numbers of microfilariae which different mosquitoes feed on the same host at the same time may imbede is emphasized by reproduction of tables from O COXSON and BEATTY [this Bulletin 1937 Vol 34 p 884 in which the difference has been as much as 0 and 738. It is shown that with pool feeding the number of microfilariae found in the stomach of *Aedes* was less than with capillary feeding. But in the small number of meals when only capillary feeding took place there were yet large variations in microfilariae numbers in the stomachs as explanation it is reported that microfilariae were often congregated in large numbers in a short length of capillary while there were very few in an adjacent one and this is held to be a probable explanation of the apparent power of a mosquito to take up more microfilariae than are present in a stomachful of finger-prick blood—a contributing factor being the possibility that, when the finger is pricked, microfilariae will escape from the capillaries less readily than do the corpuscles. Observation of microfilariae round the support to the suggestion that entanglement of microfilariae in the stomach has any effect in this concentration. [Would it not be worth while to search the special observation tubes for yet another possible reason for the concentration of the relative fewness of *Aedes*? The explanation of the authors of the relative fewness of microfilariae in finger blood and in pool blood is that they escape from capillaries less readily than do red cells. In the same way it is reasonable to suppose that having got into the stomach of the mosquito they pass on into the intestine less readily than do red cells. Yet O COXSON and BEATTY (this Bulletin 1938 Vol 35 p. 781) wrote During and soon after feeding sheathed microfilariae (Mf)

bancrofti) are passed by *C. fatigans* per rectum. If microfilariae are passed during feeding red cells are presumably passed yet more readily with the result of a concentration of the larvae in the mosquito's stomach beginning even during the feed.] C. I.

KNOTT (James) *Filariasis of the Testicle due to Wuchereria bancrofti*
—*Trans Roy Soc Trop Med & Hyg* 1939 Nov 25 Vol. 33
No 3 pp 335-347

The primary lesion of filariasis is a sterile inflammatory reaction about a dead worm, in a lymphatic vessel. The vessel is occluded and there results an obliterative lymphangitis which causes dilatation hypertrophy and varicosity with peripheral lymphstasis. The lymphatics of the testicle are especially vulnerable to such lesions, for they are quite long have no collaterals, and drain against gravity. Lymphstasis in the testicle is shown by definite clinical signs in the cord, epididymis and testis which are often the only signs of filariasis demonstrable on physical examination.

A patient with early filariasis may show (1) no demonstrable signs whatever (subclinical stage) (2) enlargement of the inguinal and sub-inguinal (femoral) lymph nodes (3) thickening and lengthening of the spermatic cord due to hypertrophy and varicosity of the lymphatics (4) enlargement and firmness of the epididymis often with definite nodular thickenings, (5) partial or complete obliteration of the sinus epididymis (6) enlargement of the testis and loss of its elastic firmness due to oedema, (7) increased fluid in the tunica vaginalis (8) thickening of the base of the scrotum due to oedema of the ligamentum testis (gubernaculum).

A hydrocele is the filarial disorder which most commonly brings the patient to the physician. The lining membrane of the sac can be obliterated by injection treatment or by open operation. Injection treatment is suitable for the small flaccid, thin walled sacs, but operation is better for the others. Filariasis of the testicle is always bilateral, and both testicles and both inguinal rings should be exposed and treated whenever an operation is done for hydrocele or hernia in a filarial subject. A transverse suprapubic incision gives adequate exposure for this procedure and has other advantages.

YOKOGAWA (Sadamu) KOBAYASI (Hidekazu) & YOSINO (Takayosi)
On Pandit's Reaction of the Serum of Elephantiasis to *Microfilaria bancrofti*—*Acta Japonica Med Trop Formosa*. 1939 Dec.
Vol 1 No 2 pp 185-192. [18 refs.]

The phenomenon investigated is that in which when blood containing microfilariae is mixed with serum from another person and stood at room temperature for an hour or more the microfilariae become sluggish and coated with adherent leucocytes [this *Bulletin* 1930 Vol. 27 p 969]

Even though it is difficult to advance an explanation of the cause of adhesion of blood cells to the microfilariae it is obvious that Pandit's reaction is controlled by the blood group of the serum to be tested, and by the suspension of microfilariae and blood cells, in accordance to the data collected which reveal that, in 8 out of the 9 cases where adhesion of blood cells to microfilariae occurred within 2 days the sera added were of different blood groups from that of the blood suspension while in those where the phenomenon took place between sera and blood cell suspension of the same blood group this did not occur before 5 days.

C. L.

CHOPRA (R. N.) & RAO (S. Sundar) Chemotherapy of Filarial Infection.—*Indian Jl Med Res* 1939 Oct. Vol. 27 No 2. pp 549-562 [12 refs.]

Although no satisfactory antifilarial drug has yet been found soamin and fouadin have given benefit in certain directions.

The authors have tested 72 drugs, cobra and viper venom human and monkey malaria. Although both the Bancroftian and Malayan infections are mentioned, the tests seem to have been done on the former essentially on the microfilariae. Since from the blood these were obtainable in numbers at night only and some 12 hours had to pass before the tests were made on them by which time they were less active, the *in vitro* tests were made on microfilariae freshly got from hydrocele fluid. In these conditions and in dilution of 1 in 10 000 atabrin and plasmoquine as brought out in the text killed the embryos in 10 seconds, whereas with fouadin and soamin they were alive though sluggish an hour later on the other hand atabrin in 15 daily oral doses of 0.1 gm. and plasmoquine in 10 daily doses of 0.025 gm. had no effect on the numbers of circulating microfilariae.

Again as regards these last, soamin had no effect while fouadin caused a purely temporary reduction. The authors own words are

Fouadin gave the most satisfactory result. The effect of the drug on the filarial parasite appears to be only temporary as the microfilariae re-appear in the blood after a lapse of a few days. This drug is very useful in controlling the inflammation and fever in filarial patients for a comparatively long period of time. And regarding soamin. The belief entertained by some practitioners that the drug causes optic atrophy appears to be without foundation. In a very large number of patients treated by us at the School with this drug not a single case of such untoward result has been observed so far. Although there does not appear to be any appreciable diminution in the number of microfilariae even after a full course the clinical effects obtained with this drug are very satisfactory. In some cases the patients have remained free from fever and inflammatory attacks for several years after one course of soamin. As compared with other antifilarial drugs soamin is cheap and can be administered easily. It is, therefore the most suitable among the arseno-compounds for treatment of filariasis.

C L

MORALES (Ovidio Suarez) Microfilariosis en Montegudo (Chuquisaca Bolivia) [Microfilarias in Montegudo, Bolivia].—*Prensa Med Argentina* 1939 Sept. 20 Vol. 26 No 38. pp 1838-1841. With 2 figs.

The microfilaria was identified by MAZZA as *Mf demarquaysi*.

Although filarial infection has never been reported from Bolivia there were found microfilariae in the blood of a patient examined for malaria. Thereafter these microfilariae were found in 4 of 6 patients coming from that locality. They have no sheath and are present in the blood by day and night. There is a spoon-shaped head free of nuclei and a filiform tail. The microfilaria measures 167μ (114μ to 204μ) long by 3.2μ (2.3μ to 3.5μ) wide at the anus.

C L.

BRUYNOGHE (G) Recherches sur les propriétés antigéniques des microfilaires de *Dirofilaria immitis* [The Antigenic Properties of *Mf immitis*].—*Arch Internat Méd Expér* 1939 Dec. Vol. 14 No 1 pp 29-39 [40 refs.] Also in *Ann Soc Belge de Méd Trop* 1939 Sept. 30 Vol. 19 No 3 pp 335-353

Injections of blood containing *Microfilaria immitis* produce no evidence of circulating antibodies when injected into rabbits guineapigs or dogs but do so in man infected with *Loa loa*

Working in Antwerp and Louvain where there is no indigenous dirofilariasis and working on an imported dog which had this the author discusses the work of others before reporting his own. He notes that almost all the recent work of injecting blood containing microfilariae has been undertaken to test the reviewer's hypothesis that microfilarial periodicity is due to daily birth and daily destruction of these larvae. The work of MURGATROYD and of HANSHELL who injected *Mf bancrofti* into man and into guineapig with their prompt disappearance is in favour of this hypothesis. He refers to KNOTT's injection of the same microfilaria into man with their persistence for 14 days but notes that since this occurred in an endemic area, the finding is inconclusive. As to *Mf immitis* Lane's hypothesis cannot be exact and the author adds experiments of his own in which after blood containing these microfilariae had been injected [? intravenously] into rabbits and dogs they were found circulating for 8 days and for one or two weeks respectively but when injected intraperitoneally into guineapigs they were never found in the blood. These experiments of his were however by the way. The real ones were undertaken to investigate antigens. When spread over a month 900 000 microfilariae were injected into two rabbits a test made a week after the injections ceased showed in the serum no precipitins and no complement deviation and in the skin no reactions to antigen.

When two adult worms from the dog were placed in the peritoneum of a rabbit there was no eosinophilia, no microfilariae in the blood, and no reactions to antigen. When spread over a month, 400 000 microfilariae were injected into the peritoneal cavity of a guineapig serological tests and skin reactions were completely negative. There was no evidence in these animals of any production of antibody or any skin reaction. He checked his technique and the efficacy of his antigen by injections of the antigen (an alcoholic extract from *Dirofilaria* itself and a watery one from the microfilariae) and found the former always and the latter generally effective in *Loa* infections thus confirming FAIRLEY's work. Antigen reactions vary then with host and perhaps with parasite, and do not permit conclusions as to the real importance of microfilariae in producing the reactions characteristic of filariasis in man

C L

BROWN (Harold P) & AUSTIN (James A.) Treatment of Heartworms in Dogs with Stibzol—a New Drug.—*Jl Amer Vet Med Assoc* 1939 Nov Vol. 95 No 752 pp 566-569

Stibzol has proved effective in sterilizing the blood of dogs infected with *Dirofilaria immitis*

Stibzol is an American product a trivalent antimony compound containing sulphur and described as antimonial-3-catecholthiosalicylic-acid-sodium. It contains 30 per cent of antimony and is put

up in a strength of 8.5 mgm. per cc. in a solution buffered to a pH rather higher than that of blood. The dose advised in a dog of 55 lbs. is 2.5 cc. rising to 5 cc. during a course of seven injections. There has been an increase in the numbers of microfilariae in the blood after the second or third injection, and again just before microfilariae finally disappear from the blood. Of the 15 dogs treated three died, with dead adult worms in the heart, in one there being a large organized clot round them and in another the dead worms extending into the lungs. The dogs that were cured were evidently not killed and examined. [The incomplete evidence is that the drug cleared the blood of microfilariae by killing the mother worms so that the young were no longer born. It evidently killed the host by stopping the blood circulation mechanically, the result of the death of the worms in the heart or by their being carried after their death as emboli into the lungs. These risks would be absent were it felt right to try the drug in *W. bancrofti* infection in man.] C. L.

MIRA (Mario Graquantio). Presenza del *Simulium damnosum* Theobald in varie località del territorio dei Galla e Sidamo e possibile esistenza di località di Onchocercosi fra le popolazioni indigene di alcune regioni dell'A.O.I. [*S. damnosum* is present in Parts of Galla and Sidamo, *Onchocercosis* is possibly present.]—*Arch. Ital. Sci. Med. Colon e Parassit.* 1939 Dec. Vol. 20 No. 12, pp. 657-662.

The author's collection of blood-sucking insects in Abyssinia made from 1938 to 1939 includes *Simulium damnosum* from the valleys of the Orto Bottego and Didessa which adjoin Kenya. There is then need to determine whether onchocerciasis exists there. C. L.

DE MEILLON (Boetha). New Simuliidae from Kenya.—*East African Med. J.* 1940 Mar. Vol. 16 No. 12 pp. 448-449. With 4 figs.

SMART (John). Simuliidae (Dipt.) from British Guiana and the Lesser Antilles.—*Trans. Roy. Entom. Soc. London* 1940 June 15 Vol. 90 Pt. 1 pp. 1-11. With 3 text figs. & 8 figs. on 4 plates. [16 refs.]

GREIG (E. D. W.). Notes on Cases of Calabar Swellings with Radiological Observations.—*J. Trop. Med. & Hyg.* 1940 Jan. 15 Vol. 43 No. 2 pp. 19-21. With 1 fig.

Three *L. loa* infections in missionaries have valuable points of importance.

All had typical symptoms and oedemata, and in all the infection was of long standing in one over 30 years without interfering with work or apparently with general health. In one radiological examinations were made apparently for the first time in this infection, with these significant results.

In the soft tissues external to the right arm there is a narrow slightly coiled opacity about 2 cm. in length, the appearance of which would be consistent with a calcified or partially calcified filaria (*Loa loa*). It is lying about 5 cm. distal to the elbow joint. Similar shadows but more coiled are seen on the medial aspect of the left radius and medial aspect of right metacarpal.

Fig 1 shows portion of λ ray of right hand. There is a very delicate but definite shadow situated on the medial aspect of right metacarpal it appears to be slightly coiled. An arrow points towards it. I think there can be little doubt but that this shadow represents a calcified or partially calcified dead adult *Loa loa* C L

LINDBERG (K) Infestation naturelle de *Mesocyclops vermisfer* Lindberg par les embryons du ver de médecine dans un puits du Deccan (Inde) [Natural Infection of *M. vermisfer* by Embryos of *D. medinensis* in Deccan Tanks.]—*Bull Soc Path Exot* 1939 Oct 11 Vol 32. No 8 pp 816-821

Only *Mesocyclops vermisfer* Lindberg has been found infected with guinea worm embryos in Deccan tanks

The numbers of cyclops examined have been *M. vermisfer* 29,587 *M. leuckarti* 28 *Eucyclops* (*Tropocyclops*) *multicolor* 57 *Eu. aguloides* 3 *Microcyclops varicans* 4 *Ectocyclops medius* 1. The numbers of infected cyclops have been 78 from the surface and 30 from the bottom. Of the 78 4 were females with ovisacs 66 females without ovisacs 1 a male and 7 copepods. Of those from the bottom 1 was a female with ovisacs and 29 females without them. The investigation extended over a year but infection was found only from 4th February to 23rd June, and between 18th February and 3rd April were collected 62 of the 78 infected cyclops got from the surface and 19 of the 30 got from the bottom. Only one embryo was present in any infected cyclops and it was always identified as that of *D. medinensis* C L

LINDBERG (K.) Contribution à la question de la présence de poissons cyclophages dans les puits du Deccan (Inde) [Cyclops-Eating Fish in the Tanks of the Deccan.]—*Bull Soc Path Exot* 1939 Nov 8. Vol 32. No 9 pp 880-882.

The writer has noticed in the Deccan step-wells swarming equally with *Mesocyclops vermisfer* Lindberg (an intermediate host of *D. medinensis*) and with small fish

A list of 19 of these fish is given and four of them *Rasbora daniconius* *Barbus ticto* *B. chola* and *Lepidocephalichthys thermalis* are included in the list of six fish given by MOORTHY and SWEET [this *Bulletin* 1937 Vol 34 p 464] as feeding on cyclops. [Those writers reported that *Barbus* (*Puntius*) *puckelli* was the only species which fully digested the cyclops] C L.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 1940 Jan 6 Vol. 114 No 1 pp 35-39 [20 refs.]—*Trichinosis* and Nonclinical Infections with *Trichinella spiralis*. Prepared by a Special Committee appointed by R C POLLOCK, Chicago Chairman Advisory Council on Live Stock and Meat [Summary appears also in *Bulletin of Hygiene*]

A valuable summary of the essential facts about trichinosis particularly as affecting U.S.A. but containing no new observations. It emphasizes the importance of distinguishing between trichinosis as a disease and the presence in man of trichinella larvae unaccompanied by apparent illness. From necropsy surveys about 18 per cent. of diaphragms examined contained trichinella larvae. The total number of known clinical cases in U.S.A. from 1842 to 1937 amounts to between

5 000 and 6,000 The symptoms of trichiniasis are dependent to a large extent on the location of the parasite within the host. Control must be along two lines, viz. adequate cooking of all pork and by eliminating the sources of infection of swine. W G Savage

ROTH (Hans) Experimental Studies on the Course of Trichina Infection in Guinea Pigs. III. Immunity of Guinea Pigs to Re-Infection with *Trichinella spiralis*—*Amer Jl Hyg* 1939 Sept Vol 30 No 2 Sect D pp 35-64 [25 refs]

As measured by the numbers of embryos of *Trichinella* found in test muscles after a feed to guineapigs of infective larvae, a previous comparatively small infection offers a measure of immunity and that immunity is due to an intestinal defensive mechanism which restricts the numbers of adults that develop there and shortens their lives.

The test muscles examined were masseters, diaphragm upper parts of the forelegs and the shanks of the hind legs. They were digested and the larvae given to the test animals in food. A dose of 2,000 killed over 90 per cent of guineapigs. When there had been a previous infection of 400 to 500 the amount of extra infection from 2,000 was insignificant when the first infection had been by fewer larvae the second one gave higher results but in no case as high as if there had been no earlier infection. A second series of experiments showed, as noted above, that the barrier to muscular infection was in the intestine C L

LICHTERMAN (Abraham) & KLEEMAN (Irving) Detection of *Trichinella* Infestation in Hogs by the Intradermal Test.—*Amer Jl Public Health* 1939 Oct. Vol. 29 No 10 pp 1098-1102 [14 refs.]

The antigen was obtained by infecting albino rats freeing the larvae by digesting their muscles, drying and powdering them, extracting the powder with normal saline and using the fluid after centrifuging This is the summary —

Two hundred and eleven pigs were skin-tested with trichinella antigen. All the pigs had been fed on uncooked garbage. Post mortem examination of the digested diaphragms was made as a check on the diagnostic accuracy of the skin test. In 4 out of 25 pigs diagnosed as trichinosis by skin tests, no evidence of infestation was found at autopsy. In 1 pig out of 186 diagnosed as non-trichinosis post mortem examination showed trichinosis. Of 211 pigs skin-tested, 208 were correctly diagnosed as to the presence or absence of trichinosis infestation. This is an error of less than 3 per cent. The error moreover is in the direction of safety being more likely now and then to diagnose a normal animal as trichinosis, than to pass a trichinosis pig as normal C L

SWARTZWELDER (J Clyde) Clinical *Trichocephalus trichiurus* Infection. An Analysis of Eighty-One Cases.—*Amer Jl Trop Med* 1939 Sept Vol 19 No 5 pp 473-481

An analysis of records of Charity Hospital of Louisiana at New Orleans for the fifteen and a half years period ending July 1st 1937 revealed 81 cases in which faecal examinations disclosed *Trichuris* eggs and no other parasites. The technique or techniques used appear to have been unrecorded. The conclusions are

A detailed analysis is presented of 81 uncomplicated clinical cases of *Trichocephalus* infection. More than two-thirds of the patients fell within

the age group from six to fifteen years. White patients predominated over colored in the ratio of 5:1 and females over males in the ratio 2:1. The most frequent symptoms were abdominal or epigastric pain, vomiting, constipation, fever, distention and flatulence, headache, backache, loss of weight and anorexia. The duration of symptoms in 44 cases was three months or less. Intestinal parasites was the most frequent clinical diagnosis and chronic appendicitis the next. Physical examination frequently revealed abdominal tenderness without rigidity. In only seven cases was a temperature elevation above 101°F noted. In about a third of the cases studied from this angle an increase of polymorphonuclear cells was observed. In about a fourth a mild leukocytosis occurred. The average eosinophil count was 4.2 per cent. and the maximum 24 per cent.

C. L.

MAPLESTONE (P. A.) & MUKERJI (A. K.) The Treatment of Trichurias Infection with Iron—*Indian Med Gaz* 1939 Oct. Vol. 74 No. 10 pp. 607-609

It is considered that evidence has been produced that the forms of iron in common use for the treatment of certain types of anaemia are of no use in removing trichuria.

The treatment given was a stock mixture of the Calcutta School of Tropical Medicine and Hospital for Tropical Diseases. The adult dose is —

Iron and ammonium citrate	30 grains
Glycerine	20 minims
Water to	1 ounce

With this 31 out patients were treated. After one week 5 were negative of whom 2 were not seen again. 2 were negative and 1 had become positive at the end of the third week. After 2 weeks of treatment 19 returned for examination and 18 were positive. Those returning after 3 weeks of treatment numbered 8 and after 4 weeks 5 and all 13 were still positive. In addition 17 in-patients who were being treated for hookworm anaemia with iron passed Trichuris eggs throughout the treatment and afterwards. As to out patients it is unlikely that they would have returned for more than the week's dosage had they not taken it. Presumably VAREZ PAUSA, whose method was being checked [this *Bulletin* 1938 Vol. 35 p. 380] used the same diagnostic method before and after treatment so that his two results would be comparable but as to actual infection rates Maplestone and Mukerji compare infection figures obtained previously when examining faeces from 3 districts got by D.C.F. and by a Stoll's technique modified by using twice as much diluent as he advises, because they had found that the more dilute preparations give higher egg counts. Of 6747 stools examined, 5548 were positive. In the district where the egg count averaged 1031 per gram, the Stoll technique missed 26.34 per cent. of those whom D.C.F. showed to be infected in that where the average egg count was 320 the Stoll technique missed 51.81 per cent. of infected and where the count averaged 232 it missed 61.19 per cent. As an exception in the second district the Stoll technique recorded as positive 0.77 per cent. of cases in which no eggs were found by D.C.F.

C. L.

KIKUTHI and MUDROW (p. 671) as a result of studies on canaries inoculated intramuscularly with sporozoites of *P. cathemerium* state that the sporozoites enter endothelial cells and become exoerythrocytic schizonts, the merozoites of which may infect other endothelial cells or red blood corpuscles. MISSIROLI (p. 671) gives the results of his investigations on the development of sporozoites inoculated under the skin of canaries. LAGO-MUGDAN (p. 672) found exoerythrocytic schizonts in fowls infected with sporozoites of *P. gallinaceum* at the time when pigmented parasites first appeared in the blood, but not in those infected by blood inoculation.

WOLFSON and CAUSEY (p. 672) show that canaries which have recovered from a *P. cathemerium* infection induced by blood inoculation are immune to both trophozoite and sporozoite inoculations. [Compare SIXTOS above]

MISSIROLI (p. 672) has noted a daily periodicity in the number of gametocytes of *P. praecox* in the blood of birds. C IV

GENEVRA (J) TOUMANOFF (C) & TRY (H T) Résultats d'une enquête sur le paludisme à Hanoi [Results of an Inquiry into Malaria in Hanoi]—Rev. Méd. Française d'Extrême-Orient 1939 Oct No. 8 PP 963-974 With 1 map [15 refs.]

Except for some outlying districts Hanoi has generally been considered to be free from endemic malaria. Sporadic cases of locally acquired malaria have however been reported from time to time. The authors of the present report give the results of the first large scale epidemiological and entomological inquiry that has been carried out. The observations were made during the winter monsoon and the summer monsoon. 5,505 children from 2 to 12 years of age were examined, which is about a fifth of the total population of this age in the city. For Hanoi as a whole the spleen index was 0.07 the parasite index 0.44 and the gamete index 0.28 per cent. The central part of the town is completely free from malaria. The only endemic centres are at the periphery notably on the Sand Bank of the Red River. Even in the latter area the spleen index was only 0.34 the parasite index 1.52 and the gamete index 0.78 per cent. figures which indicate very feeble endemicity.

Eight species of Anopheles were found, *A. barbatipes*, *A. sinensis*, *A. vagus*, *A. philippinensis*, *A. fuliginosus*, *A. acronotus*, *A. tessellatus* and *A. kochi*. *A. vagus* formed 77.89 per cent. of the total, and *A. sinensis* 20.49 per cent. No important malaria vector was found. On the Banc de Sable conditions are favourable for an enormous proliferation of these normally harmless species. The region is liable to flooding when the floods subside extensive marshes are left. The population is poor and lives in insanitary conditions. There is constant communication with areas in which malaria is highly endemic. Norman Wicks

CARR (Henry P) MELÉNDEZ (Joaquín Fernández) & ROS (Albert) Malaria Reconnaissance of the Province of Oriente in Cuba. Amer. J. Trop. Med. 1940 Jan. Vol. 20 No. 1 PP 1-10 With 1 chart

Oriente is the easternmost of the six provinces of Cuba. It is the most mountainous. A malaria survey of the whole island progress this of Oriente is the first to be reported.

The mountains of Oriente are of no great height there is no high plateau and there are but few dwellings above 1 000 feet Such endemic malaria as there is is almost confined to places below 1 000 feet and is most prevalent in the Canto River valley During the survey 22,203 children in schools in all parts of the Province were examined for splenomegaly and the blood of 9 783 children for malaria parasites. The total population of the Province is 1 109,233 The spleen rates for white and negro children were 10 and 6.6 per cent. respectively and the parasite rates 1.2 and 1.6 per cent Of the 1,825 enlarged spleens 1 623 were palpable only on deep inspiration Malaria parasites were more frequently found in children with enlarged spleens than in the remainder the splenomegaly is thus probably due to malaria. Malaria endemicity is low but occasional epidemics occur 1934 was the last epidemic year Of the positive blood films 77 contained *P. falciparum* and 60 *P. vivax* *P. malariae* was not found Five species of Anopheles were found *A. albanus* *A. crucians* *A. grabhami* *A. vestitipennis* and *A. atropus* *A. albanus* was far and away the most prevalent and is almost certainly the important vector in Oriente.

N IV

CORRADETTI (Augusto) L'epidemiologia della malaria nella regione Uollo Jeggiu (Africa Orientale Italiana) [Epidemiology of Malaria in the Uollo Jeggiu Region, Italian East Africa]—*Riv di Malariologia* Sez I 1940 Vol 19 No 1 pp 39-64 With 8 figs. (1 map) & 4 plates. English summary

This report gives the results of 20 months observations in the Uollo Jeggiu region The observations were confined to the Italian population for the most part working on road construction thus eliminating complicating factors arising from immunity consequent upon previous infection factors which are inseparable from a study of malaria in the indigenous population Doctors in all parts of the large area sent thick film preparations of all suspected malaria cases to the laboratory at Dessie To this material was added preparations from the hospital at Dessie *P. falciparum* infections formed 52.2 per cent *P. vivax* 44.9 and mixed infections 2.8 per cent of the total positive findings Below 1 000 metres intense *A. gambiae* breeding and severe endemic malaria characterize the neighbourhood of permanent collections of water throughout the year during the rainy season *A. gambiae* is found everywhere at this altitude and epidemic malaria occurs Between 1 000 and 1 500 metres *A. gambiae* are few and localized during the dry season and malaria cases are exceptional with the onset of the rains intense *A. gambiae* breeding begins and is followed by epidemic manifestations of malaria Between 1,500 and 1,900 metres no malaria occurred during the dry season the disease appeared during the rains Above 2 000 metres no case of locally contracted malaria was observed *A. gambiae* is much the most important vector *A. pharoensis* may transmit the disease Other species of Anopheles found were *christyi* *caneris* *constanti* *demeilloni* *dithali* *garnhami* *macmahoni* *marshalli* *pretoriensis* *rhodesiensis* var *dithalisimilis* and *squamosus*

N IV

DE MEILLON (B) & LEECH (H S) Notes on Ethiopian Anophelinae.—*Bull. Entom. Res.* 1940 Apr Vol. 31 Pt. 1 pp 81-87 With 5 figs

LEWISON (H. S.) On the Wing Forms of *Anopheles funestus* Giles.—*Bull Entom. Res* 1940 Apr Vol. 31 Pt 1 pp 57-58.

SAURE (P. G.) The Position of Human Malaria Oocysts on the Stomach of *Anopheles maculipennis*—*Arch Roumaines Path Experim et Microbiol* Paris 1938 Sept Vol. 11 No. 3, pp 351-354 With 3 folding plates

The author has previously described the action of the salivary gland secretion of *A. maculipennis* on blood within a few seconds after the ingestion of blood by this mosquito agglutination of the blood occurs. The anterior end of the mid-gut is swollen with clear blood serum and the agglutinated red cells collect at the posterior end. This probably explains the fact that malaria oocysts are more numerous at the posterior end of the stomach of infected *A. maculipennis*. As this insect generally rests with its head directed upwards gravity may explain the accumulation of the red cells at the posterior end of the stomach and the consequent distribution of oocysts.

To test this theory the author devised the following experiment. Mosquitoes after feeding on a suitable host were placed each in a piece of narrow glass tubing about an inch long plugged with cotton wool at each end sufficiently tightly to prevent the insect from turning. The tube was then placed so that the mosquito was standing on its head. It was kept in this position for 48 hours to allow oocysts to penetrate. Only about 20 per cent of mosquitoes survived this ordeal. After 48 hours the survivors were treated as ordinary infected mosquitoes and dissected on the 8th day. (It is possible to place the mosquito in the inverted position within a few seconds of its completing its feed.) Excellent illustrations show that the above treatment resulted in the oocysts being much more numerous in the anterior portion of the stomach than is normally the case.

Similar results were not obtained with *Aedes aegypti* infected with *P. fallinacrus*. The salivary gland secretion of *A. aegypti* does not agglutinate blood. N IP

BORO (Mark F.) On the Correlation between the Incidence of Stomach and Gland Infection in *Anopheles quadrimaculatus* infected with *Plasmodium vivax*—*Am J Trop Med.* 1940 Jan Vol. 20 No 1 pp 129-131

When lots of *A. quadrimaculatus* infected by a single infecting feed are being incubated the author makes a habit of examining at least 10 per cent. of the lot while the parasite is still in the oocyst stage. Those examined include nearly all dying a natural death. In the observations recorded both wild and unsectary bred *A. quadrimaculatus* were infected with various strains of *P. vivax*. The salivary glands of all mosquitoes used for inoculation are examined. If large numbers of mosquitoes be examined the incidence of infection as revealed by stomach and gland dissection respectively is in substantial agreement. There was no significant difference between the infection rates of mosquitoes that died a natural death and of those that were killed. It is unlikely that the mortality among mosquitoes undergoing incubation is caused by malaria infection. N IP

VENHUIS (W G) The Hyrcanus Problem in the Netherlands East Indies, with Description of a Wide Spread Malaria-carrying Variety *An hyrcanus* \ (First Communication).—*Meded Dienst d Volksgezondheid in Nederl Indië* 1939 Vol 28. No 4 pp 378-390 With 5 figs [22 refs.] Also in *Geneesk Tijdschr v Nederl Indië* 1940 Jan 2 Vol 80 No 1 pp 27-43 With 5 figs on 3 plates [23 refs.] [In Dutch]

An examination of pupal pelts of *A hyrcanus* in Java revealed marked differences from the pupal pelts of both *A hyrcanus sinensis* and *A hyrcanus nigerrimus*. Subsequent examination showed that nearly all the *A hyrcanus* of Java and the Celebes belong to this new variety for which the author proposes the provisional name *A hyrcanus A*. The deck of the egg of this new variety is narrow. The larva is characterized by sutural hairs with 12-23 branches the antenna is swollen clear and transparent or dark brown in the basal half. The hair B on segment III of the pupa has 48-80 branches as contrasted with 8-38 in *A h sinensis* and *A h nigerrimus*. In the adult the dark spot on the middle of vein 8 is shorter than the apical spot. At Benteng in the Celebes 54 of 524 *A hyrcanus A* were found infected. In Karangbimangoen Java, 48 of 466 specimens of this variety were infected. *A hyrcanus* \ is thus a very potent vector of malaria.

N W

SINTON (J A) Studies of Infections with *Plasmodium ovale* IV.—The Efficacy and Nature of the Immunity acquired as a Result of Infections Induced by Sporozoite Inoculations as compared with those by Trophozoite Injections.—*Trans Roy Soc Trop Med & Hyg* 1940 Jan 29 Vol 33 No 4 pp 439-446

This is a study of the results of the reinoculation with *P ovale* of patients who had previously been infected, at varying intervals of time, with either homologous or heterologous strains of that parasite. Primary infections were sometimes induced by sporozoites sometimes by trophozoites. Reinoculations were sometimes made with sporozoites, sometimes with trophozoites. The study is based on 40 cases. It appears that the immunity which follows infection induced by sporozoites is more effective than that following infection induced by trophozoites. The author has previously shown that parasites derived directly from sporozoites are more aggressive than those resulting from trophozoite injections the resulting clinical reaction is more severe. This probably indicates more intensive antigenic stimulation of the host. The immunity developed after both methods of infection is probably mainly if not entirely operative against trophozoites and not against sporozoites as such [See also SCHILLING this Bulletin 1940 Vol 37 p 866]

N W

SASPORTAS (L.) Le paludisme chez le nourrisson. [Malaria in Infants].—*Rev du Paludisme et de Méd Trop* Paris. 1940 Feb 15 Vol 1 No 8 pp 33-44 [18 refs.]

An infant born in Paris began to have febrile attacks when he was two months old. Two months later a diagnosis of malaria was made numerous parasites were found in the blood species not stated. The possible sources of infection are discussed at length. The infant lived

LEESON (H S) On the Wing Forms of *Anopheles foveatus* O'Han.—*Bull. Entom. Res.* 1940 Apr Vol 31 Pt 1 pp. 57-58.

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The author has previously described the action of the salivary gland secretion of *A. maculipennis* on blood within a few seconds after the ingestion of blood by this mosquito agglutination of the blood occurs. The anterior end of the mid-gut is swollen with clear blood serum and the agglutinated red cells collect at the posterior end. This probably explains the fact that malarial oocysts are more numerous at the posterior end of the stomach of infected *A. maculipennis*. As this insect generally rests with its head directed upwards gravity may explain the accumulation of the red cells at the posterior end of the stomach and the consequent distribution of oöcysts.

To test this theory the author devised the following experiment. Mosquitoes after feeding on a suitable host were placed each in a piece of narrow glass tubing about an inch long plugged with cotton wool at each end, sufficiently tightly to prevent the insect from turning. The tube was then placed so that the mosquito was standing on its head—it was kept in this position for 48 hours to allow oöcysts to penetrate. Only about 20 per cent of mosquitoes survived this ordeal. After 48 hours the survivors were treated as ordinary infected mosquitoes, and dissected on the 8th day. (It is possible to place the mosquito in the inverted position within a few seconds of its completing its feed.) Excellent illustrations show that the above treatment resulted in the oocysts being much more numerous in the anterior portion of the stomach than is normally the case.

Similar results were not obtained with *Aedes aegypti* infected with *P. gallinaceum* the salivary gland secretion of *A. aegypti* does not agglutinate blood. N IV

BORD (Mark F) On the Correlation between the Incidence of Stomach and Gland Infection in *Anopheles quadrimaculatus* Infected with *Plasmodium vivax*—*Amer. J. Trop. Med.* 1940 Jan Vol. 20. No 1 pp 129-131

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the feasibility of control of malaria by drug treatment alone in an area in which anti mosquito measures are too costly to be practicable. The year was an exceptionally dry one there was consequently a diminished flow in the Chagres River with resulting backwater conditions very favourable to anopheline breeding. As before monthly surveys were made of the populations concerned all parasite carriers thus revealed were treated in one group with atabrin followed by plasmoquine and in a second group with quinine sulphate followed by plasmoquine. Malaria incidence was low till the closing months of the year when epidemic conditions appeared in spite of the continuous treatment of all detected carriers that has been carried out through several years. The incidence of the three species of parasite throughout the year was *P. falciparum* 69.9 *P. vivax* 19.0 and *P. malariae* 11.1 per cent. The parasite rate of infants less than a year old was only 1.5 per cent. Up to July there was very little active malaria there after parasite rates rose two or threefold with a marked increase of new infections and of heavy infections. In one place there was a close correlation between the number of Anopheles caught in houses and the number of infections. In another village malaria was very prevalent although but few Anopheles could be found. The year's cumulative incidence of malaria for the whole area was 26.1 per cent the highest incidence was in the age-group 10 to 20. N IV

GOUGET (R.) La campagne antipaludique de 1938 dans le département d'Oran [The Malaria Campaign of 1938 in Oran]—Arch Inst Pasteur d'Algérie 1939 Dec Vol. 17 No. 4 pp. 578-584

RODRAIN (J.) Les plasmodiums des anthropoïdes de l'Afrique centrale et leurs relations avec les plasmodiums humains [Relationship of Malarial Parasites of Anthropoid Apes of Central Africa to those of Man.]—Ann Soc Belge de Méd Trop 1939 Dec. 31 Vol. 19 No. 4 pp. 563-572

During the past two or three years the author has carried out experiments arranged to throw light on the relationship between the malarial parasites which occur naturally in chimpanzees and those of man. By inoculating human beings with infected chimpanzee blood and chimpanzees with the human parasites it has been possible to arrive at certain conclusions which were controlled by inoculating blood from the inoculated chimpanzees or man back again to other men or chimpanzees, with a view to determining whether latent or inapparent infections unassociated with the appearance of parasites in the blood had occurred.

It has been found that *P. reichenowi* is distinct from the human *P. falciparum* and differs from it as regards the forms which develop in cultures while it is quite without virulence for man. The chimpanzee moreover is entirely refractory to *P. falciparum*.

The chimpanzee parasite *P. schweileri* is without virulence for human beings and is probably distinct from *P. vivax* which it resembles morphologically. The human *P. vivax* inoculated to chimpanzees remains as an inapparent infection for several weeks (28 days) as proved by the inoculation of blood back to human beings. It seems clear that the positive result obtained by MESNIL and ROUBAUD (1920) in which an apparent *P. vivax* infection of 9 days' duration was produced in a chimpanzee may have been due to the lighting up of a

with his parents in the Barracks of the Gardes Républicains in the Place de la République in Paris. The infant had received injections of maternal blood before the diagnosis was made but not before the onset of febrile attacks. The mother was a Corsican but she had lived in Paris for 9 years. The father served in Morocco 12 years previously. Neither gave any history of malaria and neither showed any evidence of infection.

The author discusses malaria in infants both congenital and acquired, and deals at some length with the literature of the subject. [References to congenital malaria in this Bulletin in recent years are—1929 Vol 26 pp 11 387 412 1930 Vol 27 p 682 1932, Vol. 29 pp 350 697 703 1933 Vol. 30 pp 474 475 1934 Vol. 31 pp 419 427 689 1935 Vol 32 pp 125 126 408 838 1936 Vol. 33 pp. 225 229 264 783 1939 Vol. 38, pp. 392, 393 492, 783 1 008]

N IV

WICKRAMASURIYA (G. A. W.) The Interactions of Malaria and Pregnancy.—*Jl. Ceylon Branch Brit Med Assoc* 1939 Nov Vol. 36 No 6. pp. 417-440

The importance and gravity of malaria as a complication of pregnancy are dealt with at length. All the medical and obstetrical complications that may arise from the association are preventable by appropriate anti-malaria therapy. The interruption of pregnancy and foetal death that may occur are both due to malaria, and not to quinine or other drug used in the treatment of that disease. Quinine in therapeutic doses is not an oxytocic. The author urges the generous use of quinine in the treatment of malaria complicating pregnancy. Larger initial doses of quinine than those normally given are often required these should be combined with bromides.

N IV

WIJERANA (E. M.) Totasquina in the Treatment of Malaria.—*Jl. Ceylon Branch Brit Med Assoc* 1939 Nov Vol. 36 No. 6. pp. 403-406

Nineteen-five febrile malaria patients, with schizonts in the blood, were treated with totasquina, and 132 similar patients with quinine bisulphate. In one series each patient received 15 grains of one or other drug a day for five days. In a second series the daily dose of both drugs was 20 grains. There were 127 *P. falciparum* infections, 59 *P. vivax* and 10 *P. malariae*. 31 were mixed infections. The author finds that totasquina is more effective than quinine bisulphate in similar doses in stabilizing temperature in causing the disappearance of parasites from the peripheral blood and in inhibiting the formation of gametocytes, in all forms of infection.

N IV

CLARK (H. C.) KOFF (W. H. W.) & JOBBINS (D. M.) A Ninth Year's Observations on Malaria in Panama, with Reference to the Occurrence of an Epidemic following Continued Treatment with Atabrine and Plasmochin.—*Amer Jl Trop Med* 1940 Jan Vol. 20 No 1 pp. 47-67

The observations recorded relate to the year September 1933 to August 1939 they are a continuation of the work of the previous year [this Bulletin 1939 Vol. 38 p 819]. Their aim is to determine

the feasibility of control of malaria by drug treatment alone in an area in which anti-mosquito measures are too costly to be practicable. The year was an exceptionally dry one there was consequently a diminished flow in the Chagres River with resulting backwater conditions very favourable to anopheline breeding. As before monthly surveys were made of the populations concerned all parasite carriers thus revealed were treated in one group with atabrin followed by plasmoquine and in a second group with quinine sulphate followed by plasmoquine. Malaria incidence was low till the closing months of the year when epidemic conditions appeared in spite of the continuous treatment of all detected carriers that has been carried out through several years. The incidence of the three species of parasites throughout the year was *P. falciparum* 69.9 *P. vivax* 19.0 and *P. malariae* 11.1 per cent. The parasite rate of infants less than a year old was only 1.5 per cent. Up to July there was very little active malaria thereafter parasite rates rose two or threefold with a marked increase of new infections and of heavy infections. In one place there was a close correlation between the number of *Anopheles* caught in houses and the number of infections. In another village malaria was very prevalent although but few *Anopheles* could be found. The year's cumulative incidence of malaria for the whole area was 26.1 per cent the highest incidence was in the age-group 10 to 20. N IV

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RODRIGUEZ (J.) Les plasmodiums des anthropoïdes de l'Afrique centrale et leurs relations avec les plasmodiums humains. [Relationship of Malarial Parasites of Anthropoid Apes of Central Africa to those of Man]—*Ann. Soc. Belge de Méd. Trop.* 1939 Dec. 31 Vol. 19 No. 4 pp 563-572.

During the past two or three years the author has carried out experiments arranged to throw light on the relationship between the malarial parasites which occur naturally in chimpanzees and those of man. By inoculating human beings with infected chimpanzee blood and chimpanzees with the human parasites it has been possible to arrive at certain conclusions which were controlled by inoculating blood from the inoculated chimpanzees or man back again to other men or chimpanzees with a view to determining whether latent or inapparent infections unassociated with the appearance of parasites in the blood had occurred.

It has been found that *P. reichenowi* is distinct from the human *P. falciparum* and differs from it as regards the forms which develop in cultures while it is quite without virulence for man. The chimpanzee moreover is entirely refractory to *P. falciparum*.

The chimpanzee parasite *P. schaeferi* is without virulence for human beings and is probably distinct from *P. vivax* which it resembles morphologically. The human *P. vivax* inoculated to chimpanzees remains as an inapparent infection for several weeks (26 days) as proved by the inoculation of blood back to human beings. It seems clear that the positive result obtained by MESNIL and ROUBAUD (1920) in which an apparent *P. vivax* infection of 9 days' duration was produced in a chimpanzee may have been due to the lighting up of a

latent *P. knowlesi* infection, particularly as at the time of this experiment little was known about the natural malarial parasites of chimpanzees.

Two attempts to infect chimpanzees with the human quartan parasite failed, but the reverse experiment of inoculating the quartan-like parasite of chimpanzees to man has not been carried out as the author has not had available a strain of this parasite. [See also this Bulletin 1939 Vol 35 p 816 1939 Vol 36 p 928 1940 Vol 37 pp 61, 367] C M Wemyss

RODHAIN (J) Les plasmodiums des anthropoïdes de l'Afrique centrale et leurs relations avec les plasmodiums humains. Réceptivité de l'homme au *Plasmodium malariae* (*Plasmodium rodhaini* Brumpt) du chimpanzé. [Relationship of *Plasmodia* of Monkey and Man. Receptivity of Man to *P. rodhaini* of the Chimpanzee.]—C R Soc. Biol 1940 Vol 133 No. 2 pp 276-277

Of the three malarial parasites of chimpanzees the one which resembles the human *Plasmodium malariae* was named *P. rodhaini* by Brumpt. In the present paper the author records an experiment in which the blood of a chimpanzee harbouring this parasite was inoculated to a human being suffering from general paralysis. Forty days later an attack of fever occurred when malarial parasites like the inoculated organisms were found in the blood films. The close resemblance of the parasites to *P. malariae* of man leaves still open the question of its identity C M W

COGGESHALL (L T) Preservation of Viable Malaria Parasites in the Frozen State.—Proc Soc Experim Biol & Med 1939 Vol 42 No 2 pp 499-501

The paper describes a method for rapidly freezing monkey blood containing either *Plasmodium knowlesi* or *P. simi* and keeping it subsequently at a temperature of -76°C . It was shown by inoculation into monkeys after rapid thawing that parasites were still alive after 70 days maintenance in the frozen state C M W

COGGESHALL (L T) The Selective Action of Sulphanilamide on the Parasites of Experimental Malaria in Monkeys *in vivo* and *in vitro*—J Experim Med 1940 Jan 1 Vol 71 No. 1 pp 13-20 With 1 fig & 1 plate

It has been found that in a monkey infected with *Plasmodium knowlesi* and *P. simi* the administration of sulphanilamide in 1 gram doses by the mouth resulted in the eradication of the virulent *P. knowlesi* infection, leaving the *P. simi* as a milder chronic infection. Investigating the metabolic activity of the two parasites according to the methods of CHRISTOPHERS and FULTON it was found that *P. knowlesi* consumed about six times as much oxygen as *P. simi* and that the addition of sulphanilamide in a concentration less than that required to bring about a cure of the *P. knowlesi* infection almost completely inhibited the consumption of oxygen of *P. knowlesi* *in vitro* but had no effect on the respiration of *P. simi* C M W

KIKUTH (Walter) & MUDROW (Lilly) Die Entwicklung der Sporozoiten von *Plasmodium cathemerium* im Kanarienvogel. [Development of Sporozoites of *P. cathemerium* in Canaries.]—*Zent f Bakt* I Abt Orig 1939 Dec. 4 Vol. 145 No 2. pp 81-88 With 15 figs. (8 coloured) on 2 plates. [15 refs.]

Working with *Plasmodium cathemerium* the authors have studied the development of sporozoites injected into the pectoral muscles of canaries. They have shown that the inoculation site contains forms which are infective to canaries before the peripheral blood has become infective. Preparations of the inoculation site excised 16 40 48 and 64 hours after the injection of sporozoites show intracellular bodies first with one nucleus and later with many which undoubtedly represent the sporozoite development in large mononuclear cells. At the end of the period the bodies represent exoerythrocytic schizonts and it is at this stage that the first erythrocytic parasites appear. That a further infection of mononuclear cells can occur is shown by the late finding in preparations of the spleen of uninucleate forms like those seen early at the inoculation site. According to the authors therefore the sporozoite first enters an endothelial cell and becomes an exoerythrocytic schizont the merozoites from which may infect other endothelial cells or red blood corpuscles. The stages of development are depicted in an excellent coloured plate. C M IV

KIKUTH (Walter) & MUDROW (Lilly) Die Umwandlung der Sporozoiten in die endotheliale Phase der Malaria Parasiten. [Development of Sporozoites into the Endothelial Phase of Malaria Parasites.]—*Riv di Malarologia* Sez I 1940 Vol. 19 No 1 pp 1-15 With 7 coloured figs. on 1 plate. [20 refs.]

This paper illustrated by a coloured plate is a description of the development of sporozoites injected intramuscularly into birds within endothelial cells at the site of inoculation. The work is the subject of the paper reviewed above. C M IV

MISSIROLI (A.) Sullo sviluppo dei parassiti malarici. [Development of Malarial Parasites.]—*Riv di Parassit* Rome. 1939 Dec Vol. 3 No 4 pp 339-342 With 2 plates. English summary

The author has continued his researches on the fate of malarial sporozoites inoculated under the skin of canaries. If the sporozoites are advanced in development as indicated by the nuclear chromatin having divided into four or more distinct masses the subsequent development may take place at the site of inoculation. If however the sporozoites are less advanced in development the nucleus having only one or two chromatin masses the development can be followed in the spleen to which they have migrated. In either case the sporozoite perhaps by the loss of some cytoplasm becomes an ovoid body in which four chromatin masses develop. Finally division into four small units each about the size of a merozoite takes place. The whole of this development occurs extra-cellularly and the interval between the time of involution and the production of the final units varies according to the degree of development of the sporozoites inoculated. It is supposed that these final units invade either red blood corpuscles to become pigmented parasites or cells of the reticulo-endothelial system

before the attack. At autopsy one showed congestion and extravasations in the central nervous system, another cerebral oedema and congestion and the third petechiae in the brain but common to all was a fairly extensive haemorrhage on the ventricular septum in the region of the bundle of His
H H S

CORTEX (W) On Conditions of Exhaustion as a Result of Summer Heats in the Palestine Plain.—*Harefuah* Jerusalem. 1939
Nov-Dec Vol 17 No. 5-6 [In Hebrew pp. 167-175
English summary p 1]

1 Damp heat causes often during the hot summer months in Palestine particularly during July-September conditions of weakness and exhaustion

2 There is considerable similarity between these morbid conditions of exhaustion and suprarenal insufficiency

3 Recent experiments on animals indicate that suprarenal insufficiency is caused by disturbances in NaCl, vitamin C and hydrogen metabolism. It seems that these disturbances constitute the main causes of the symptoms observed.

4 In the conditions of exhaustion described the disturbance in NaCl and hydrogen metabolism was proved. This disturbance was caused by excessive sweating and drinking a large quantity of fluids not containing NaCl

5 There is no doubt that the loss of NaCl constitutes the main cause of these conditions of exhaustion which affect also the suprarenal gland.

6 This serves as an indication that in the treatment of these cases a reserve of NaCl in the body is to be maintained by adding NaCl to the diet and by decreasing the amount of fluids. In severe cases preparations for the therapy of the suprarenal gland may be used in addition to the medical treatment

WECHSLER (Z) Autonomic Dystonia in the Tropics and its Treatment.
—*Jl Trop Med & Hyg* 1940 Jan 15 Vol 43 No 2 pp 21-24

This is a study of the so-called tropical neurasthenia which though usually discussed in too cursory a manner in text-books, is important in that about one-half of the white population of tropical countries exhibit symptoms and a significant proportion require medical treatment. The symptom complex varies greatly and the aetiological factors include climatic conditions, intoxications, infective diseases and constitutional and psychogenic factors. Symptoms include slackness, excessive sweating, tremor, tachycardia, rise of blood pressure, headache, increased basal metabolism, diarrhoea, loss of appetite and oligomenorrhoea. Emotionalism is present and may be pronounced it may even cause a condition similar to that of incipient thyrotoxicosis.

There are innumerable transition stages and the general picture is one of disturbed visceral and endocrine function as well as of changes in psychic equilibrium, without demonstrable organic change. Sympathicotonia and hyperevitation of the parasympathetic system are present, though these are rarely sharply defined since the one leads to the other.

The author has attempted to inhibit the autonomic centres in the brain by drug therapy but since autonomic disturbances often have

their cause in the peripheral organs themselves it seems logical to extend therapy to the use of drugs acting on autonomic nerve endings as well. The compound Bellergal (Sandoz) contains a sympathetic sedative (ergotamine tartrate 0.3 mgm.) a parasympathetic sedative (Bellafoline 0.1 mgm.) and phenobarbitone (20 mgm.) and is useful provided that the individual dosage is determined. In mild cases 1 tablet twice daily suffices but up to 6 tablets daily may be necessary though the dose given should not produce dryness of the mouth disturbances of accommodation or excessive sedative action. Usually administration for several weeks is indicated and withdrawal should be gradual. More restful sleep is the first sign of improvement. Physical and dietetic measures should also be employed—several cold showers daily a diet rich in vitamins and carbohydrates and poor in proteins. Bromide or chloral may be needed. The results of this treatment have been markedly effective. C W

REPOUD (A) Une névrose orientale [An Oriental Neurosis].—*Schweiz Med Woch* 1940 Feb 17 Vol. 70 No 7 pp 148-150

The author has studied the condition of latak. After giving a general sketch of the symptoms of this curious condition he discusses its possible or probable nature but does not seem to reach any very satisfying conclusion. Physical examination of nine patients has not revealed any defect all seemed to be in excellent general health nor could he detect any sign of mental disorder such as, for example schizophrenia. The general mental state says the author was fairly low on an average but in one instance was higher than the patient's associates and he concludes. One can only say that the intellectual level does not seem to differ materially from that of other natives and that latak is the result of the mental make-up (*la résultante du fond mental*) peculiar to certain Eastern peoples. [This is mere tautology and no explanation.] Latak has been classed with the hysterics with this the author disagrees the mentality is not that of the hysteric. The subjects are pained at their condition and fight hard against it. He thinks that it is more of the nature of an obsession or anxiety neurosis. Later however he states, apart from their ectokinetic crises they exhibit no tendency to phobias or obsessions and anxiety is not the usual state of these patients and again there is no proportionate relation between the external excitant and the intensity and extent of the distress phenomena of latak but there exists a certain state of anxious tension readily set free. Finally latak is then merely a neurosis the symptoms of which are proportionate to the rudimentary mentality of low class natives. [These statements which have been quoted are difficult to reconcile they seem to contradict each other. Moreover the peculiar limitation of the disease to the Malay race is not explained (see also this *Bulletin* 1925 Vol 22, p 70 1929 Vol 26 p 581 and 1936 Vol. 33 p 73)] H H S

NYASALAND PROTECTORATE ANNUAL MEDICAL & SANITARY REPORT FOR THE YEAR ENDING 31ST DECEMBER, 1938.—[A Case of Onyiasis pp 57-58 SHELLEY (Horace M.) Govt Pathologist]

The patient was a Nyasaland born native aged 32 years, repatriated from Southern Rhodesia where he had been working in the mines for

before the attack. At autopsy one showed congestion and extravasations in the central nervous system, another cerebral oedema and congestion and the third petechiae in the brain but common to all was a fairly extensive haemorrhage on the ventricular septum in the region of the bundle of His. H H S

COMEN (W) On Conditions of Exhaustion as a Result of Summer Heats in the Palestine Plain.—*Haeresuah* Jerusalem. 1939 Nov-Dec Vol 17 No. 5-6 [In Hebrew pp 167-175. English summary p L.]

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- 4 In the conditions of exhaustion described the disturbance in NaCl and hydrogen metabolism was proved. This disturbance was caused by excessive sweating and drinking a large quantity of fluids not containing NaCl
- 5 There is no doubt that the loss of NaCl constitutes the main cause of these conditions of exhaustion which affect also the suprarenal gland
- 6 This serves as an indication that in the treatment of these cases a reserve of NaCl in the body is to be maintained by adding NaCl to the diet and by decreasing the amount of fluids. In severe cases preparations for the therapy of the suprarenal gland may be used in addition to the medical treatment

WECHSLER (Z) Autonomic Dysfunction in the Tropics and its Treatment.—*Jl Trop Med & Hyg* 1940 Jan 15 Vol 43 No 2 pp 21-24

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There are innumerable transition stages and the general picture is one of disturbed visceral and endocrine function as well as of changes in psychic equilibrium without demonstrable organic change. Sympathicotonia and hyperventilation of the parasympathetic system are present though these are rarely sharply defined since the one leads to the other.

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COMES (W) On Conditions of Exhaustion as a Result of Summer Heats in the Palestine Plain.—*Harefuah* Jerusalem. 1939
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4 In the conditions of exhaustion described the disturbance in NaCl and hydrogen metabolism was proved. This disturbance was caused by excessive sweating and drinking a large quantity of fluids not containing NaCl

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The author has studied the condition of latah. After giving a general sketch of the symptoms of this curious condition he discusses its possible or probable nature but does not seem to reach any very satisfying conclusion. Physical examination of nine patients has not revealed any defect all seemed to be in excellent general health nor could he detect any sign of mental disorder such as for example schizophrenia. The general mental state says the author was fairly low on an average but in one instance was higher than the patient's associates and he concludes. One can only say that the intellectual level does not seem to differ materially from that of other natives and that latah is the result of the mental make-up (la résultante du fond mental) peculiar to certain Eastern peoples. [This is mere tautology and no explanation.] Latah has been classed with the hysterics with this the author disagrees the mentality is not that of the hysteric. The subjects are pained at their condition and fight hard against it. He thinks that it is more of the nature of an obsession or anxiety neurosis. Later however he states apart from their ectokinetic crises they exhibit no tendency to phobias or obsessions and anxiety is not the usual state of these patients and again there is no proportionate relation between the external excitant and the intensity and extent of the distress phenomena of latah but there exists a certain state of anxious tension readily set free. Finally latah is then merely a neurosis the symptoms of which are proportionate to the rudimentary mentality of low class natives. [These statements which have been quoted are difficult to reconcile they seem to contradict each other. Moreover the peculiar limitation of the disease to the Malay race is not explained (see also this *Bulletin* 1925 Vol. 22 p 70 1929 Vol. 26 p. 581 and 1936 Vol. 33 p 73)] H H S

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H H S

COHEN (W) On Conditions of Exhaustion as a Result of Summer
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MINCHIN (R. L. Haviland) Primary Lateral Sclerosis of South India. Lathyrism without Lathyrus.—*Brit Med J* 1940 Feb 17 pp 253-255 [18 refs] [Summary appears also in *Bulletin of Hygiene*]

The author has investigated a series of 21 cases all but one males and all between 19 and 45 years of age with symptoms of spastic paraplegia with retention of abdominal and cremasteric reflexes and no sensory changes. They seemed clearly to be cases of primary lateral sclerosis and by elimination the syndrome was seen to be identical with that of lathyrism. *Lathyrus sativa* is however not consumed by the inhabitants of South India. The diets in Madras Presidency are deficient in vitamins and proteins. *L. sativa* grains are rich in proteins but deficient in tryptophan and the author concludes that the so-called lathyrism may be due not to the toxic effect of the Lathyrus seed [though other vetches than *L. sativa* may produce the symptoms] but to the tryptophan deficiency which may occur even in the absence of this vetch. [If this is confirmed the name lathyrism will have to be restricted to those cases which are due to Lathyrus or discarded altogether if tryptophan deficiency is the cause. It is puzzling enough to have a *pellagra sine pellagra* and a *scarlatina sine eruptione* without the addition of *Lathyrismus sine lathyro*]

H H S

WESTPHAL (Albert) Protozoen der offenen Körperhöhlen des Menschen in experimentellen Abszessen. [Intestinal and Other Protozoa of Man in Experimental Abscesses].—*Zent f Bakt* I Abt Orig 1939 Oct 9 Vol 144 No 7/8 pp 416-421

Cultures of intestinal protozoa were inoculated into rats either intramuscularly or subcutaneously with a view to observing if in the event of abscess formation by reason of the bacteria in the culture the protozoa would develop in the pus or abscess wall. Besides *Entamoeba histolytica* which developed on one occasion only out of ten as demonstrated by culture from the abscess wall the three human trichomonads *Trichomonas hominis*, *T. vaginalis* and *T. longata* were the only protozoa which grew in the abscesses with any regularity. Negative results were obtained with *Entamoeba gingivalis*, *Chilomastix mesnili*, *Enteromonas hominis* and *Balanidium coli*.

C M W

ZEETTI (R) Le lait-sang comme milieu de culture pour *Trichomonas Mazzanti*. [Blood-Milk as Culture Medium for *Trichomonas foetus*].—*Boll Sezione Ital Soc Internaz di Microbiologia* Milan 1939 May-June Vol 11 No 5-6. pp. 129-135 [24 refs.]

The author states that he has been able to cultivate with ease and certainty *Trichomonas foetus* (termed by him *Trichomonas Mazzanti*) in a medium consisting of sterilized cow's milk to which 5 to 10 per cent of defibrinated blood (presumably cow's blood) has been added.

C M W

FISCHER (I A) Hospital Accommodation in the Netherlands Indies.—*Bull. Colonial Inst Amsterdam* 1939 Dec Vol 3 No 1 pp 24-35

The author gives interesting figures of the populations and the available hospital beds in the Dutch East Indies. It is pointed out

6 years. From May 1938 he had been in Gatooma native hospital, but the nature of his illness is not known. He came to Zomba Hospital on 26th October 1938, complaining of mild abdominal pain and cough. He was then of poor physique and examination discovered haemorrhagic vesicles on the mucosa of the cheeks and soft palate and beneath the epithelium of the tongue one was as large as $1 \times \frac{1}{2}$ inch. Gums were soft and spongy. Blood counts gave red cells 3 460 000 a few normoblasts and some degree of anisocytosis white 8 000 platelets 170 000 per cmm reticulocytes 1.5 per cent. haemoglobin 65 per cent. C.I. 0.9 a relative lymphocytosis (37 per cent.) at the expense of polymorphonuclears (56 per cent.) Bleeding time $9\frac{1}{2}$ minutes or nearly four times the normal and clotting time 4 minutes. Ten cc. of the patient's whole blood were injected intramuscularly. In four days the vesicles disappeared and the general condition improved and the patient left hospital 17 days after admission. This is the first case of onyiasis recorded in Nyasaland, but the fact that the man had resided and worked for several years in Southern Rhodesia should be noted (see this *Bulletin* 1938 Vol. 35 pp. 74-444 1939 Vol. 36 pp. 157-158 938) H. H. S.

JUNGKE (W.) Zur Ätiologie des von Dr. Kröber beschriebenen eigenartigen Krankheitsbildes bei afrikanischen Eingeborenen. [The Aetiology of the Disease described by Kröber in African Natives].—*Arch. f. Schiff's u. Trop. Hyg.* 1939 Sept. Vol. 43 No. 9 pp. 416-418 [Summary appears also in *Bulletin of Hygiene*]

KRÖBER has described a peculiar disease of the natives of the west shore of Lake Victoria. The disease consists of a fistulous, nodular elephantiasis of the genital region, combined with an ascending inflammation of the urinary passages. He considered gonorrhoea to be the sole cause of this disease. Junge agrees with Kröber as to the importance of gonorrhoea in the aetiology of this type of elephantiasis, but is unable to offer any direct proof of this hypothesis. The disease is seen in the Cape Mount region where balharziasis is not observed, but not in Balahoun where balharziasis is extremely common and gonorrhoea rare. He admits, however to having obtained in a few cases a positive Frei reaction, and in some others *Wuchereria bancrofti* were found. Finally he describes a patient in whom similar symptoms developed after circumcision, followed by ulceration of the penis, the appearance of an urinary fistula, and finally of an urethral stricture. Therefore he concludes that every disease which in its course produces an obliteration of the lymphatics of the genital region, could be a cause of Kröber's disease though the most frequent cause is gonorrhoea [see this *Bulletin* 1940 Vol. 37 p. 226]

H. A. H. Green

[Elephantiasis is after all, merely a symptom and may be due to several causes. Manson-Bahr's classification is very serviceable: he speaks of (1) Congenital (Milroy's disease) (2) Parasitic (filarial) (3) Septic *Elephantiasis nostras* in lymphatic infection by streptococci (4) Toxic (e.g. chrysarobin absorption) (5) Obstructive (adenitis tuberculous, malignant syphilitic etc.) (6) Venous secondary to thrombosis (phlegmasia alba dolens)]

~ Kröber's disease might come under either *Elephantiasis nostras* (3) or Obstructive elephantiasis (5). Ed.]

principle is an amine or an alkaloid in others a glucoside in others again a volatile oil a toxalbumen or a resin. The plants belong to Cryptogams and Phanerogams they may be poisonous to man to livestock to fish to insects they may constitute forms of food poisoning as unintentional or deliberate adulterants and so forth. In this article after brief preliminary remarks the authors have tabulated a list of 88 Families naming their active principles the names of nearly 400 toxic plants and a note on each as to the class of poison contained and its mode of action. The whole is an admirable introduction to Indian toxicology and should serve as a sound basis for more detailed research.

H H S

RAYMOND (W D) *Tanganyika Arrow Poisons A Medico-Legal Problem.*—*East African Med J* 1939 Mar Vol. 15 No 12. pp 419-431. With 13 text figs & 7 figs. on 3 plates. [24 refs]

Regarding the abstract of the article by W D Raymond on Tanganyika Arrow Poisons [see this *Bulletin* 1940 Vol 37 p 72] the author has written to point out that the toxicity for man as compared with that for animals is not proportional to their weight but to their body surface and is calculated according to the following formula —

$$D_M = \left(\frac{M}{A}\right)^{\frac{2}{3}} \times D_A \text{ where } D_A = \text{Dose for animal}$$

$$D_M = \text{Dose for man}$$

$$M = \text{Wt. of man}$$

$$A = \text{Wt. of animal}$$

H H S

REVIEWS AND NOTICES

DOMINGUEZ (Francisco) [Ancien Professeur et Doyen de la Faculté de Médecine de la Havane etc.] *Docteur Carlos J Finlay Son centenaire (1933) Sa découverte (1881) [Doctor Carlos Finlay and his Work]*—302 pp. With 7 figs. on 5 plates & 1 text fig. 1935. Paris. Librairie Louis Arnette 2 Rue Casimir Delavigne.

This book was published in 1935 but did not reach the Bureau until June 1940. The author was a personal friend of Dr Carlos Finlay and tells us that he spent four years in producing this memoir because he felt the necessity for bringing forward chapter and verse to confirm his statements and to establish once and for all Finlay's position regarding the transmission of yellow fever by the mosquito. Some writers have ascribed the priority of this suggestion to Beauprethuy but this is certainly incorrect. Nott put forward the idea in 1848 five years before Beauprethuy. Professor Dominguez affirms first, that Finlay was unaware of Beauprethuy's publications and second that according to the latter the mosquitoes were believed to inoculate man with the fever (virus) which they had sucked up from the marshes whereas Finlay stated that the mosquito was the direct transmitting agent from the sick to the healthy that the female only acted in this way and then only after being impregnated.

The reviewer agrees with the author—and has in fact expressed the view on more than one occasion—that full justice has not been done to

that in parts of Java and Madura the density of the population is equal to that in Holland itself and that since 1920 the population of the Indies has increased by 23 per cent and in 1930 totalled over 60 millions. In Java and Madura (population 41½ millions) there are 27 general hospitals with 20 785 beds in the Outer Provinces (Sumatra, Borneo, Great East population 19 millions) there are 432 general hospitals with 28 792 beds. In these general hospitals the ratio between the number of days treatment given and the maximum number of available bed-days is the same for both groups of colonies, 57-58 per cent which is the proportion of available beds used. On the other hand the proportion in the case of special hospitals is between 90 and 100 per cent showing that the accommodation in such hospitals is severely taxed. The proportions of these special hospitals and beds is about the same as that of the general hospitals, i.e. the Outer Provinces are more adequately provided for.

A quotation is given from an account written by Professor E. P. Sijpekes who visited missionary hospitals and clinics in various parts. He stresses the impression that missionary hospitals are the most intimately in contact with the natives. This is probably due to the great devotion which, in view of their calling as missionaries, the doctors there expend on their work and to their talking with the people in *their own tongue*. Their system approaches the Javanese. The central Petronella Hospital is in touch by telephone with a number of auxiliary hospitals and a travelling clinic goes regularly round the district. Government hospitals can rarely afford an organisation as adequate as this.

Agricultural colonies for non-violent native patients have been instituted, and the method has been extended to lepers. In this there are 10 sanatoria and many consultation bureaux, and in 1940 nine more sanatoria are to be added. But this method of combating the disease is regarded as too expensive for the great national disease, not to be devoted to the prevention of the tuberculosis situation. malara Java and anti-leishmaniasis and to the improvement of nutrition and housing in the hope of mitigating the tuberculosis situation. One sanatorium has proved so attractive that patients flocking for treatment cannot be accommodated and an arrangement has been made by which they are taken into the houses of a neighbouring village while undergoing treatment. There was no means of checking this influx and all the Government could do was to guide the activities into the right channel with one hopes, adequate safeguards against infection of the village hosts. Other villages of this kind will probably develop. C II

CHOPRA (R. N.) & BADIHWAR (R. L.) Poisonous Plants of India.—
Indian J. Agric. Sci. 1940 Feb. Vol. 10 Pt. 1 pp 1-44

No abstract can do justice to this excellent article. It is a mine of information which should be kept accessible to toxicologists, research workers, and those engaged in tropical medical jurisprudence. The climatic conditions of India are an epitome of the climates seasons and soils of the British Empire and plants with active and medicinal principles grow abundantly. Only a proportion, and not a large proportion of the 2,000 and more such plants has been investigated, even superficially and fewer still in detail. In some cases the toxic effects are immediate in others cumulative in some the active

principle is an amine or an alkaloid in others a glucoside in others again a volatile oil a toxalbumen or a resin. The plants belong to Cryptogams and Phanerogams they may be poisonous to man to livestock to fish to insects they may constitute forms of food poisoning as unintentional or deliberate adulterants and so forth. In this article after brief preliminary remarks the authors have tabulated a list of 88 Families naming their active principles the names of nearly 400 toxic plants and a note on each as to the class of poison contained and its mode of action. The whole is an admirable introduction to Indian toxicology and should serve as a sound basis for more detailed research.

H H S

RAYMOND (W. D.) *Tanganyika Arrow Poisons. A Medico-Legal Problem.*—*East African Med J* 1939 Mar Vol 15 No 12 pp 419-431 With 13 text figs & 7 figs on 3 plates [24 refs.]

Regarding the abstract of the article by W. D. Raymond on Tanganyika Arrow Poisons [see this *Bulletin* 1940 Vol 37 p 72] the author has written to point out that the toxicity for man as compared with that for animals is not proportional to their weight but to their body surface and is calculated according to the following formula —

$$D_M = \left(\frac{M}{A}\right)^{2/3} \times D_A \text{ where } D_A = \text{Dose for animal}$$

$$D_M = \text{Dose for man}$$

$$M = \text{Wt. of man}$$

$$A = \text{Wt. of animal}$$

H H S

REVIEWS AND NOTICES

DOMINGUEZ (Francisco) [Ancien Professeur et Docteur de la Faculté de Médecine de la Havane etc.] Docteur Carlos J. Finlay. Son centenaire (1822-1922). Sa découverte (1881). Docteur Carlos Finlay and his Work.—312 pp With 7 figs on 5 plates & 1 text fig 1935 Paris Librairie Louis Arnette 2 Rue Cassini 75014

This book was published in 1935 but did not reach the Press until June 1940. The author was a personal friend of Dr. Carlos Finlay and tells us that he spent four years in preparing it. A review began as he felt the necessity of bringing forward chapters a review to confirm his statements and to establish once and for all Finlay's position regarding the transmission of yellow fever by the mosquito. Some writers have ascribed the priority of this suggestion to Longstrech but this is certainly incorrect. As far forward the idea is 1881 five years before Beaupre's publication. Professor Beaupre was first that Finlay was aware of Beaupre's publication and second that according to the latter the mosquitoes were believed to transmit the virus which they had sucked up from the diseased man whereas Finlay stated that the mosquito was the disease bear off agent from the sick to the healthy that the mosquito acted in this way and then only after being impregnated.

The reviewer agrees with the author—and has in fact expressed this view on more than one occasion—that full justice has not been done to

Finlay at all events it was tardy and delayed, but in the present work which is one of special pleading for his friend, the author at times tends to claim too much. Some of these claims will be noted in what follows, but it is not quite correct to say that subsequent events have shown that Finlay was justified in writing that "Anyone who takes the trouble to read my work will be convinced that among the facts and deductions attributed to modern investigators [this was written in 1899] it will be difficult to discover a single one which has not been enunciated, demonstrated, or suggested by me as a result of my personal observations and experiments" (translated from *Trabajos selectos*, p. 430).

The following which is quoted more than once will serve as an instance. A mosquito was allowed to bite a patient on the fifth day of disease (he died on the seventh) three days later this man fell ill and six days put to bite a healthy man. A week later this man fell ill and six days afterwards showed symptoms of benign yellow fever. (If the disease was yellow fever the patient had probably been infected by another mosquito than the experimental one. This the author seems to acknowledge later saying "The control was not perfect and an individual inoculated by Finlay with one of his mosquitoes was also liable to be bitten by others heavily infective". The same instance is referred to 12 days before it bit the second man and it was 14 days after inoculation when the patient had yellow fever and albuminuria. This is claimed as the first case of yellow fever to be produced experimentally by a mosquito bite.

At that time the common belief was that infection was acquired in the air inhaled or in food ingested the mosquito idea was new and rejected off-hand.

Manson's Filaria work of 1878-83 was not known in the western hemisphere in 1881 therefore says the author "to Finlay without doubt belongs the honour of being the first to note and prove the transmission of disease from man to man by the intermediation of a blood-sucking insect." Obviously an invalid argument.

Finlay enunciated, among other propositions, that inoculation of yellow fever by the bites of one or two mosquitoes is a good way of conferring, without risk, immunity against severe forms of disease and of protecting those exposed to infection in epidemic foci. He claims, however more than he can prove when he asserts that inoculation by a single bite is not able to give rise to severe forms of yellow fever. The cases of CARLOS and LAZAR—one nearly fatal, the other causing death on the seventh day of illness—refute this dictum.

Again and again the author girds at the American Commission for ignoring Finlay and citing others who made similar suggestions later. Finlay complains that the members would not listen to him and states that had they done so in 1899 and acted upon his advice an incalculable number of lives would have been saved in Havana. The list of eleven experimental cases of the Americans is contrasted with one of 104 of Finlay's. The former demonstrated (1) That the mosquito must bite an infected person early in the course of his disease and (2) That it must have time to develop the virus if a fresh subject is to be infected by it.

We must dwell a little on Finlay's list of inoculated subjects if we are to do justice to the author's work. This list gives many details but one all-important is omitted, which we refer to later nevertheless.

it does not show the clear-cut results of the Commission's tests the cases are far from conclusive and in many respects the results are at variance with our present knowledge. A few will be referred to here the numbers are those in the list.

No 1 One mosquito bit an infected person on the fourth day of illness and later a healthy subject [the interval is not stated in this or any of the 104 listed]. Fourteen days afterwards the latter developed albuminuria but no yellow fever.

No 7 A subject was bitten on 7th August 1881 by a single mosquito which had fed on a patient on the third day of illness and on 11th September by another which had fed on the sixth day of a case which ended fatally. No pathological effects followed but on 10th September the following year (364 days afterwards) the man developed yellow fever with jaundice and haemorrhage but no albuminuria.

No 15 A subject bitten by one mosquito which had fed on an albuminuric yellow fever patient on the fourth day of disease. No pathological effects but the man died of yellow fever 8 months later.

Nos 19-21 Three subjects each bitten by a single mosquito (but each by a different mosquito) which had fed on a yellow fever patient on the fifth day of illness. One developed yellow fever 355 days after one three months and the other five months later.

No 34 The mosquito bit an albuminuric patient on the third day of his attack of yellow fever. No pathological effects followed the subsequent biting of a healthy subject who however died of yellow fever 6 years later. Another similar case is reported (No 68) in which death from yellow fever occurred 5 years later.

No 83 Lastly a man was bitten twice by a mosquito which had fed on a yellow fever patient with albuminuria on the third and sixth days of his illness. No pathological effects followed, but the man died of yellow fever 22 weeks and 5 days later.

No explanation is given of the term no pathological effects following inoculation the fact is stated in 90 of the 104 recorded. It may be that this is what we now understand as inapparent disease and this would seem to be borne out by a later statement (p. 130). Again though the number of mosquitoes which were allowed to bite is stated and the day of disease of the infected person (which might be as late as the seventh) we can find no mention of the length of interval between the feeding on the infected subject and the biting of the non-infected. Subsequent work of the Commission showed this to be of the utmost importance but Finlay did not believe in the limitation of infectivity in man to the early days of illness.

Again as regards period of incubation Finlay held that in the natural disease or after inoculation this ranged between 5 and 21 days the American Commission established it to be between 41 hours and 5 days 17 hours. The general belief to-day is 4 to 13 days mostly nearer the lower figure and very rarely less. Finlay in his table gives up to 25 days.

Finlay was clearly right in stating as the basis of prophylaxis three great principles. Isolation of the patient in a mosquito-protected room or ward fumigation of the infected house and anti mosquito measures.

The author asks Should the work of the American Commission be regarded as one of control or of discovery? The reply we think is both its findings in many respects confirm (and so control) the

pityriasis capitis, and that they are generally to be found in the group of parakeratoses. Also dyshidrosis is now admittedly linked up histologically with eczema.

There is not much with which one would quarrel but the remarks on the capillary resistance test suggest a specificity which is not in accordance with everyday experience for instance, drug eruptions and other conditions may give a positive result to the test. Further impetigo neonatorum is stated to be caused by streptococci though most recent workers find that the lesions are commonly caused by staphylococci, and the controversy on the subject is not mentioned. Nor is poikiloderma congenitale mentioned. Lastly the excellence of the histological pictures might be enhanced by some indication of scale or magnification. But these are minor details that cannot mar the general conclusion—which is that this book has been badly needed for some time that every dermatologist especially of the younger generation will find it essential as a book of reference, and that having acquired it he will be led to approach his subject from many new angles with considerable gain to himself and his profession.

There is one erratum on p 279 line 15 of the second paragraph
 "X the normal red blood cell count should read X the patient's red blood cell count. C H Whittle

BURTT (B D) A Field Key to the Savanna Genera and Species of Trees, Shrubs and Climbing Plants of Tanganyika Territory
 Part I. Genera and Some Species.—pp xvi+53. 1939 Dar es Salaam Govt Printer [2s]

This little book (it can easily be carried in the pocket) is intended as a guide to those interested in the identification in the field of the woody plants of the savanna region of East Africa. It can be used by those who have no previous knowledge of botany and in the absence of a microscope. The key is not applicable to the tropical rain forests or the coastal thickets.

The booklet should be valuable to those interested in the biology of *Glossina*, and was completed by the author while he was working in the Department of Insect Research Tanganyika Territory just before his tragic death, with Swynnerton in 1939. C W

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940.

[No 10

SUMMARY OF RECENT ABSTRACTS *

VIII TYPHUS GROUP OF FEVERS.

General

HERZIG (p 985) reports an outbreak of fever in persons upon whom lice used for the preparation of anti typhus vaccine were fed in Weigl's laboratory. Rickettsia were found in the blood of the patients and in the lice and resembled *R. quintana* of trench fever. They were extracellular. WERNER (p 986) states that in this outbreak the symptoms corresponded with those of trench fever as seen in the war of 1914-1918.

Human sera giving significant agglutination of *Proteus* OY19 OXA or OX2 are reported by SHORTT (p 982) from the Madras Presidency.

COX (p 984) cultivates the Rickettsia of various forms of typhus by inoculation into the embryonic membrane enclosing the yolk mass of the developing fowl embryo. The embryo is frequently killed by the fourth day but passage from egg to egg is possible and the virulence is enhanced.

RAYNAL and FOURNIER (p 983) note that in guinea-pigs orchitis may be produced by injection of material containing *Bact. paratyphosum B* or *Spirillum minus*. These results may be confused with the Neill-Mooser reaction of the different forms of typhus, but the finding of *Bact. paratyphosum B* and the curative effect of novarsenobenzol help to differentiate them respectively from typhus. The serological reaction, the temperature chart and the characters of the swelling also help in differentiation. The scrotal reaction is rare with the virus of epidemic typhus but occurs with most other forms, especially with murine.

BLANC and NOURY (p 982) describe a temporary local skin immunity in rabbits inoculated with the virus of murine typhus and boutonnense fever which is not correlated with general and visceral immunity. GIROUD in two papers (pp 982-983) confirms this finding and also shows that local skin reactions are most marked in animals which are least susceptible to general infection.

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

Proteus O119 type. Vectors lice and fleas

STARZYK (p. 464) shows that at laboratory temperature *R. prowazekii* in human serum remains virulent for 6 days and in dried lice or excreta up to 60 days at 5°C. virulence is retained in dried louse intestine for 6 months. These findings are of epidemiological importance in showing how infection may be carried in infected clothing over long periods. BLANC *et al.* (p. 464) quote evidence to suggest that the dried excreta of fleas infected with murine typhus can transmit infection to man if placed on the nasal mucous membrane or conjunctiva, or swallowed in water. It is possible that louse-borne typhus may be transmitted by the oral route in a similar way. The authors go further than Starzyk, and state that dried excreta of lice or fleas may remain infective for at least 12 months. It may therefore be possible for infection to be carried over from one epidemic season to the next without any actual cases occurring in the non-epidemic season.

In the *Bulletin de l'Institut d'Hygiène du Maroc* (p. 888) it is pointed out that the epidemic of typhus in Morocco was brought on by the migration of the rural population into the cities and into huts built thrown up around the towns on account of the failure of the crops in the country districts and the consequent danger of starvation. The cause of the failure of the crops was drought and the importance of extensive irrigation schemes is stressed. Other methods of prevention are mentioned. FOURNIER (p. 883) reports that typhus in Algeria during 1937 occurred in small rural epidemics, principally during winter and spring and was relatively mild.

Investigating the typhus which occurs in sporadic fashion in the Bhim Tal area of the Humma Hills, BLEWITT (p. 481) found no evidence of infection in about 1000 ticks collected from animals and man or from the scrub. He inclines to the opinion that the disease is louse-borne and that infection is imported along the extensively used trade route through the valley. Discussing an outbreak of typhus in the Viceroyal bodyguard at Dehra Dun in 1929 THOMPSON (p. 890) concludes that these were cases of true louse-borne disease and not due to ticks. This area is not far from Bhim Tal referred to by BLEWITT.

PIJPER and CROCKER (p. 468) state that in S. Africa epidemic typhus, presumably louse-borne and murine typhus produce agglutinins to *Proteus O119*, *O112* and *O11A* in low dilutions only whereas in Europe epidemic typhus produces agglutinins to *Proteus O119* only. The virus of S. African epidemic typhus immunizes against murine and tick typhus, that of murine immunizes against tick typhus but not epidemic typhus, that of tick typhus does not immunize against the other two. GEAR (p. 896) however disputes this finding. In louse-borne typhus he has found agglutination of *Proteus O119* in high titre and of *O11A* only irregularly. This form, therefore is serologically similar to classical European typhus. In one case of murine typhus studied the findings were similar to those seen elsewhere.

SCAFFIDI (p. 889) details the clinical features of typhus seen in the natives of N. Ethiopia mentioning especially the fact that in black skins the rash is often transient and often absent. The disease varies from mild to severe and fatal forms, and evidence is quoted to show that it is louse-borne and that the Neill-Mooser reaction is no

given in guineapigs. The Weil Felix reaction is positive but the strain of *Proteus agglutinated* is not given. GIUNTA and D'IGNAZIO (p 989) claim excellent results in Addis Ababa from a form of treatment in which vitamins B₁ and C are used together with mercurochrome injections. Lumbar puncture is practised if the cerebrospinal fluid is under pressure and subcutaneous glucose is employed together with cardiac stimulants.

The strains of typhus virus isolated in Manchuria by IWATA (p 995) fall into three classes murine intermediate and epidemic the first is the least severe and the last the most severe form and the scrotal reaction is constant only in the first and does not occur in the last.

JORDAN and FLETCHER (p 990) point out that a disinfectant containing impure cresylic products to which 4 per cent. of ammonia was added, was lethal to lice and their eggs in one hour. Purified preparations such as Lysol, Izal etc. were only slightly toxic even with the addition of ammonia.

LECCISOTTI (p 461) found a positive Weil Felix reaction in 47 of 93 rats examined in Taranto.

DYER (p 991) states that endemic typhus has gradually spread in the S.E. United States from the towns to the country districts and that the numbers recently reported are much greater than those found a few years ago. Practically all the small rodents tested have been found susceptible. KEMP (p 991) states that in Texas infection is contracted in workshops or stores or in rat infested houses. RUIZ CASTAÑEDA (p 994) describes a mild form of typhus probably of murine origin in Mexico. *Proteus X19* is agglutinated and the Neill Mooser reaction in rats is given. It is thought that spread may take place through lice but spread through the ectoparasites of rodents cannot be excluded.

MATHEW (p 469) reports human cases of typhus of the murine type in N. Queensland.

In the epidemic of typhus in Shanghai during 1938 RAYNAL (p 464) found that the virus isolated from human patients was identical with that isolated from rats in the houses of patients and that it produced fever and orchitis in guineapigs. It is probably therefore a murine virus.

BRUNEAU (p 993) failed to produce fever in natives of Tonking suffering from nervous diseases by the injection of murine virus and concludes that in these natives many cases of infection may pass undetected.

From rats captured in Kuala Lumpur LEWTHWAITE (p 463) isolated two strains of the *Proteus X19* type of typhus virus. From rats on a plantation where tsutsugamushi was common a strain which apparently caused agglutination of *Proteus X19* and *Proteus AK* and which gave complete cross immunity with the town rat strain was isolated. Although with this strain cross immunity with the virus of tsutsugamushi was indefinite transmission experiments with the rat flea and guineapigs produced in one animal a definite *Proteus OXA* type of infection. This apparent transmutation from the *Proteus X19* to the *Proteus XA* type may be explained by the possibility that both types were present in the original material, but the matter is being further investigated.

From the blood and brains of rats and guineapigs infected with murine typhus ANIGSTEIN and LAWKOWICZ (p 993) cultivated on Noguchi's semi-solid agar medium, 6 strains which were definitely

rickettsial in appearance, and two which were strains of bacilli resembling *Proteus*. The latter were motile fermented carbohydrates with the production of acid and gas, and did not produce indol.

PHILIP and PARKER (p. 466) show that the murine virus can be isolated from rats up to 370 days and from mice up to 150 days after infection, but that with Rocky Mountain fever and boutonneuse fever isolation was not possible after 30 days.

VIGLIE (p. 467) has succeeded in infecting pigs, rats, guinea-pigs, rabbits and puppies by feeding them on material, such as the brain of guinea-pigs and the urine of white rats, infected with murine typhus. He (p. 894) has also succeeded in infecting rats by feeding them upon bread soaked with the urine of rats and men suffering from murine typhus. He suggests that man may become infected by consuming food soiled by the urine of rats. This suggestion has been made before see this *Bulletin* 1938 Vol. 35 p. 782. Experiments by LE CROUX and PRYANSLAC (p. 468) suggest that though infection with the murine virus by the respiratory tract can probably take place it can only be exceptional.

LOWANNO (p. 892) reports double orchitis in a human case of murine typhus.

BOZARIUS (p. 470) noted an increase in red blood cells in guinea-pigs infected with endemic typhus. There was leucopenia during the febrile period with leucocytosis on convalescence.

In investigations carried out on *Myopulax forsteri*, a small rodent infected with typhus, ZIA and LIU (p. 472) found that agglutinins for *Rickettsia* and for *Proteus* X19 were both produced, but that those for *Rickettsia* appeared earlier than those for *Proteus* X19 and did not persist so long. The titres for the two agglutinins were not parallel in the same animal.

Proteus OXA type Vector mite

The endemic typhus of New Guinea is of the *Proteus* XK type and resembles tsutsugamushi. GUNTHER (p. 478) shows that the patients always give a history of a recent visit to mite infested country and that the primary sores occur in positions favoured by mites. All persons entering the mite infested bush or swamps are freely bitten but the cases of disease are relatively few—possibly the common mite *Trombicula kirishii* is only rarely infected, or possibly it is some less common species which is concerned. Transmission from rodent to rodent is mentioned as a possibility through mites. In New Guinea GUNTHER and SCHROEDER (p. 1000) report 46 cases of the *Proteus* OXA form of typhus with a mortality of 20 per cent. since 1934. All were white people and no native case has been seen. The area is infested with mites and bush rats. They advise exclusion of the primary sore. MATHEW (p. 469) points out that in N. Queensland the patients with typhus, whose sera agglutinated *Proteus* OXA were held workers, especially those who were engaged in clearing scrub. The bites of mites and ticks are frequently found on such workers. In 17 cases a primary sore was present in 30 none was seen and in 24 there was lymphadenitis. Positive Weil-Felix reactions were given by the sera of a number of rodents examined.

KAWAMURA and YAMAMOTO (p. 1000) report 32 cases of tsutsugamushi from the Pescadores. *Proteus* OXA was agglutinated and a primary sore was seen in all. The disease is less severe than that seen in Japan. BATHURST and CHAPMAN (p. 899) report a case of

typhus with agglutination of *Proteus* OAK from Hanoi. WIJERAMA (p 1000) reports two cases of the *Proteus* OAK form of typhus from Ceylon. There was no rash or primary sore. Orchitis developed in a guinea pig inoculated with the blood of one of these.

HEINEMANN (p 479) reports 3 cases of second infection with mite-borne typhus in 258 cases seen. The second attacks occurred between 1 and 2½ years after the first and it seems that little if any immunity from the first attack was present.

Indeterminate type Vector tick.

DYER (p 991) points out that spotted fever is no longer confined to the Rocky Mountains, but is now found in Eastern Canada British Columbia and Brazil. PILCHER (p 474) reports two cases the first to be diagnosed from the New England area. JORDAN (p 475) reports on a number of cases of Rocky Mountain fever in Iowa ticks (*Dermacentor variabilis*) collected in affected areas were shown to be infected. GIBBONS (p 474) found no evidence of infection with the virus of Rocky Mountain fever in 30 000 ticks collected in Western Canada. BISHOPP and SMITH (p 475) give an account of the bionomics of *Dermacentor variabilis* which is the principal vector of Rocky Mountain fever in central and eastern U.S.A. Dogs and horses are infested but rabbits are of little importance and the principal host of the immature stages is the meadow mouse *Microtus pennsylvanicus*. Adult ticks are most abundant in spring and early summer. Derris powder forms a suitable base for a dog wash.

PHILIP and DIAS (p 993) failed to effect transmission of Rocky Mountain fever through four different genera of triatomid bugs.

DAVIS and PARKER (p 477) show that in Rocky Mountain fever agglutination of *Proteus* X19 may not be produced or if positive may be weaker than equal to or stronger than that of X2. Similarly agglutination of *Proteus* X2 may be negative or positive.

DIAS (p 477) states that *Amblyomma striatum* and *A. cajennense* found on dogs in Brazil are known vectors of Brazilian spotted fever and that sera of dogs have been found to agglutinate various strains of *Proteus*. The dog is therefore probably a reservoir of the disease, as in Rocky Mountain fever and boutonneuse fever. TRAVASSOS (p 478) reaches a similar conclusion in regard to the São Paulo disease.

DE MAGALHÃES (p 478) has proved that *A. cajennense* can transmit the fever of Minas Geraes but this may also be carried by *Cimex lectularius*. He further (p 998) finds that the blood of patients is not usually infective during the incubation period but remains infective up to the 18th day of disease. In nature the virus has been found in the rabbit opossum and preá [the Brazilian opossum] and in *Amblyomma cajennense* and *Cimex lectularius*. The virus seldom passes through an L5 filter candle. It can be cultivated on the chorio-allantoic membrane of fowl embryo. The virus does not pass through healthy skin.

GEAR (p 996) has seen two types of tick bite fever in S. Africa. One is relatively mild, with constant primary sore and is carried by larval ticks (*Amblyomma hebraeum*) from veldt rodents. The other is severe and may be fatal, the primary sore is not always seen. It is contracted in the city and suburbs of Johannesburg and is carried from domestic dogs by the dog tick *Haemaphysalis leachi*. The viruses of these two forms are identical and the author considers that the differences noted in the diseases are due to the fact that the former is contracted by

Nigeria, which serve as permanent homes for *Glossina tachinoides*, necessary to exterminate the fly during the hot dry season. As *G. morsitans* resists high temperatures and low humidities complete clearing is required for the extermination of this species.

In one district of Nigeria HARDING (p. 697) has found a close correlation between the sleeping sickness incidence and the death rate from all causes. This district lies in the middle of a sleeping sickness belt. In a second district on the edge of the belt, however, there was no correlation and the author concludes that here, during the period under review, the disease was of a non-fatal kind.

HAWKING (p. 697) has cultivated *T. gambiense* as readily in the blood of patients with sleeping sickness as in that of normal persons. TARABINI CASTELLANI and MERIGGI (p. 698) show that *T. gambiense* injected into the skin of guinea-pigs produces no cutaneous reaction. STEINFELD (p. 698) has failed in attempts to destroy arsenic-resistance in trypanosomes by means of various physical and chemical agents but reports that in some experiments partial or temporary reduction in resistance was observed. JACK (p. 699) discusses larval growth in *Glossina morsitans* and larviposition in relation to blood meals. RICHARDS *et al.* (p. 699) discuss the system of nomenclature for tropical woodland types of importance in relation to *Glossina*. YORKE (p. 700) has summarized his recent work on various aromatic diamidine compounds in the treatment of trypanosomiasis, leishmaniasis and babesiasis. DRYDEN (p. 700) has studied the changes in blood sugar and urea in animals as a result of injection of different doses of 4-4'-diamidino stilbene.

HAWKING (p. 701) has investigated the concentration of Bayer 205 in the blood of treated patients and points out that there is a great variation between one person and another. The drug may be found up to 9 months after the last injection, but cannot be detected in the cerebrospinal fluid by chemical means.

DEBOIS and HONN (p. 701) report work which suggests that in infected animals treated with Bayer 205 the action of the drug is not to prepare the trypanosomes for destruction by phagocytes and that it does not depend on the integrity of the reticulo-endothelial system. KLEINE and KUMERT (p. 702) infected calves with *T. rhodesiense* and treated them with Bayer 205 (which is of little value in natural trypanosomiasis of cattle). All the treated calves were immediately cured but controls, which remained in good condition, continued to harbour trypanosomes in the blood for 7 to 9 months.

VAN HOOB *et al.* (p. 703) show that Bayer 205 protects guinea-pigs against subsequent infection by *T. gambiense* for a considerable time. They could not find evidence of antibody formation in infected and subsequently cured animals or that cured animals are constantly more protected than normal animals which had received the drug. Although Bayer 205 is a prophylactic of the first order the authors draw attention to the danger of masking the disease unless the whole population is examined and the infected are treated, and they lay down a system of prophylactic dosage.

VAN DEN BRANDEN (p. 705) has specified a toxicity test for Germanin and allied drugs.

SICI (p. 705) gives an account of the good results obtained by the synergic treatment with tartar emetic and atoxyl, or moranyl and trypanamide, of patients with blood-gland or meningeal infections.

respectively KOPP and SOLOMON (p 705) give a detailed account of the complications which may follow the use of trypanamide. These are visual, nitritoid gastro-intestinal cutaneous cerebral neuritic or of other less well defined types. KOLMER *et al* (p 706) found that tests of mobility are not suitable for estimating the spirochaeticidal and trypanocidal effects of the arspenamines *in vitro* but YORKE in comment criticizes the technique employed.

BROOM and BROWN (p 708) show that substrains of *T. brucei* maintained by cyclical passage resemble other substrains derived from the same parent strain in serological type with certain detailed differences. Different strains do not necessarily resemble each other.

SCHILLING (p 709) gives results of his work in Tanganyika Territory which indicates that a series of inoculations of calves with minute numbers of *T. congolense* leads to the production of immunity against natural infection and that the offspring of immunized animals are themselves resistant.

HOARE (p 710) shows that *T. evansi* is incapable of development in *Glossina*. He suggests that *T. evansi* may have originated from *T. brucei* by the introduction of the latter into localities free from *Glossina* and its subsequent propagation by direct passages. The behaviour of *T. evansi* is similar to that of non transmissible strains of *T. brucei* after prolonged maintenance by direct passages in mammals.

KLIGLER *et al* (p 710) have investigated the antigenic composition and immunizing properties of *T. evansi* and *T. lewisi*. Injection into animals of dead *T. evansi* produces partial and transient immunity, but drug treatment of an active infection gives rise to solid immunity of considerable duration.

STONE and THOMPSON (p 711) show that *T. equiperdum* may be alive and infective after 14 months in frozen rat blood.

Chagas's disease.—DIAS (p 712) discusses the nomenclature of *T. cruzi*.

MAZZOTTI (p 712) found differences in virulence of strains of *T. cruzi* obtained from Triatomidae of different species in Mexico and also in trypanosomes from the same species but from different areas. The frequency of passage from bug to mammals may account for these variations. He (p 712) inoculated small and large numbers of *T. cruzi* into mice but the results did not vary in a constant manner with the numbers injected.

MAZZOTTI (p 713) reports that five species of Triatoma and one of Rhodnius have been found to be infected in one part of Mexico. He (p 713) states that in Mexico there are 15 species of Triatomidae of which 9 are found to be naturally infected. Three of these are newly discovered vectors. LENT (p 713) shows that *Clerada apicicornis* though normally phytophagous may under certain conditions suck blood and that metacyclic development of *T. cruzi* takes place in it. There are 28 species of Triatomidae which have been found naturally infected. GALLARDO (p 714) describes the effects of the bite of *T. rubrofasciata*.

MAZZA *et al* (p 714) describe a case of infection by the bite of *T. infestans*. MAZZA *et al* (p 715) describe an acute case in which the swelling of the face (caused presumably by the bite of Triatoma) persisted for 3 months. MAZZA and MINARA (p 715) describe a case of Chagas's disease in which a generalized rash appeared, lasting for 14 to 17 days without itching or desquamation.

within a territory of removing the population to a locality where there is no fly. As except in the far North, there is practically no country which is not infested with tsetse the aim of sleeping sickness settlement schemes is to make a patch of country completely safe by exterminating the fly and then to move sufficient people into it to allow of its being kept free from tsetse.

Settlement Schemes.—As the surveys of the Eastern districts of Zaria Emirate showed that 20–40 per cent. of the population were infected it was decided that an attempt should be made to eradicate tsetse in a corridor some 70 miles long by 10 miles wide, and to move the population from the periphery into the area. This fly-free corridor would provide a safe area and would give a valuable fly-free trade route. Neighbouring districts were to be protected by communal clearing campaigns. Very interesting and encouraging details of this settlement scheme are given.

During 1939 205 miles of streams were cleared at an average cost of £11 15s. per mile. Large mahoganies and other high branching timber trees were left wherever possible.

Investigation suggested that an allowance of 4·3 acres per head of population should be made, and last dry season arrangements were completed for the settlement of 34 outlying hamlets into 18 new villages situated in the corridor. During the rains the people started to clear their new farms. The building of as many villages as possible is now taking place and most of them have already been provided with cement-lined wells. It is hoped to move about 3 000 people in 1940. Details are given of the general layout of the small hamlets. The main town in the district, Anchan, has been enormously improved.

W. Yorke.

NASH (T. A. M.) The Effect upon *Glossina* of changing the Climate in the True Habitat by Partial Clearing of Vegetation.—*Bull Entom. Res.* 1940 Apr Vol. 31 Pt. 1 pp 69–84 With 4 figs & 2 plates [10 refs.]

Different species of tsetse fly are known to be adversely affected, to a greater or lesser degree, by high temperatures and low atmospheric humidities. It has been shown possible by partial clearing of islands of forest which normally serve as permanent homes, to alter the climatic conditions so that *Glossina tachinoides* is exterminated during the hot, dry season in Northern Nigeria. This paper describes in detail the amount of clearing necessary to produce a definite change in climate (increase in maximum temperature, increase in saturation deficiency and decrease in water content of the soil). The precise relation between these climatic changes and the numbers of the tsetse population is indicated. Another species of tsetse *G. morsitans* is more resistant to high temperatures and low humidities, particularly because it selects resting places with favourable micro-climates when these are available so that complete clearing is necessary for its extermination.

This is an excellent account of a carefully controlled field experiment and important both as an exercise in field ecology and as a piece of practical work of far reaching importance. Incidentally being based on results of laboratory work it shows once again the importance of apparently purely academic work in planning measures to control insects.

Kenneth Mellanby

HARDING (R. D.) The Influence of Sleeping Sickness on Mortality in Two Districts of Northern Nigeria.—*Trans Roy Soc Trop Med & Hyg* 1940 Mar 20 Vol. 33 No 5 pp 483-500 With 1 map

In this paper the author has attempted to correlate the death rate from all causes with the sleeping sickness incidence in suitably sized groups of two non adjacent districts in Northern Nigeria. The districts investigated were first Igabi District of Zaria Province an area of some 600 square miles containing a population of about 14 000 and second, the Kankara District of Katsina Province covering an area of about 550 square miles and containing a population of 36 000. The position of these districts is shown in a map of Northern Nigeria.

The author summarizes the results of his investigations as follows —

The method employed was to obtain data, by methodical questioning of every householder from which the crude death and other rates could be calculated over a preceding period, and be correlated with the known incidence of sleeping sickness. The figures were worked out village by village, and the villages then combined into groups of sufficient size to make the numbers significant.

In the first district, Igabi, a close correlation was obtained, the death rate rising from 71.4 per 1 000 with a sleeping sickness incidence of 18.8 per cent., to 104 per 1 000 with a sleeping sickness incidence of 28.6 per cent. In other words an additional death occurred for approximately every additional three people infected. The infantile mortality rate also showed a close correlation with the sleeping sickness incidence. As infants were not found to be infected, this result was unexpected. The reasons for it are discussed. The birth rate showed no definite correlation.

In the second district, Kankara, no correlation was found to exist, and the conclusion is drawn that, during the period under review sleeping sickness was not fatal. The patients must either have harboured a mild chronic infection carrying no threat to life or have been undergoing spontaneous cure.

The clinical types of the cases found are described. They are similar in the two districts and would not have been suspected of having so different a prognosis.

It is pointed out that Igabi lies in the middle of a sleeping sickness belt, and it is suggested that the virulence of the disease in this district may be accounted for by the very free means of communication which exist, and by the movement in the past of large gangs of labour tending to disseminate many different strains of trypanosome imported from outside. The infection in Kankara, on the other hand, was probably of later though not very recent, introduction and as the district is situated on the very edge of the belt and is traversed by no main roads or railways, the possibility of a multiplicity of strains existing is very much less. If this conclusion is correct, it emphasizes the necessity of careful sleeping sickness control measures in areas which may be opened up in the future.

The mean birth rate found in Igabi was 64.7 per 1 000 and the mean death rate 84.2. The corresponding figures for Kankara were 44.1 and 23.6. The reliability of these figures is discussed.

IV Y

HAWKING (Frank) Culture of *Trypanosoma gambiense* in Blood from Normal and Infected Persons.—*Ann Trop Med & Parasit* 1940 Apr 30 Vol. 34 No 1 pp 31-34

During a recent visit paid by the author to Leopoldville BRUTSAERT and HEYERD showed him their technique for the cultivation of

ORRICE (Warrington) Recent Work on the Chemotherapy of Protozoal Infections.—*Trans Roy Soc Trop Med & Hyg* 1940 Mar 20. Vol. 33, No 5 pp. 464-478 [27 refs.] Discussion pp. 478-482 [EWINGS (J A) DALE (Henry) KING (H.) HAWKING (F) CHESTERMAN (C. C) MURGATROYD (F) & LORKE (Warrington) (in reply)].

In this address the author summarizes the results of the investigations which followed the discovery of the direct trypanocidal action of synthamin. The work has culminated in the production by Dr EWINGS of Mevara May and Baker of a number of aromatic diamidine compounds, certain of which, particularly 4,4-diamidino diphenoxy pentane, have been found to be of great activity in the treatment of a number of protozoal infections of man and stock especially trypanosomiasis, leishmaniasis and babesias. Most of the results recorded in this paper have already been published and noticed in this Bulletin. The present address gives rather later information regarding the clinical trials in human trypanosomiasis and leishmaniasis. The author concludes with the following words—

The investigations which I have described this afternoon have opened up a fresh field in chemotherapeutic research. New compounds of considerable activity in a number of protozoal infections have been discovered whether they will prove of practical value it is as yet impossible to forecast, but the preliminary clinical trials have been sufficiently encouraging to justify the hope that, if we pursue the work—both chemical and biological—to its ultimate conclusion, our labours may not be in vain."

[V]

DEVINE (J) Studies in Chemotherapy produced by Administration of 4 Trop Med & Parasit 1940 pp 67-71

XXIV.—Changes in the Blood 4 Diamidino Stilbene.—*Ann* Apr 30 Vol. 34 No. 1

This note records an examination of the toxic effects in rabbits of 4,4-diamidino stilbene. Tables show the results of blood analyses for sugar and urea of rabbits which had received, respectively 15 mgm, 25 mgm and 27.5 mgm. per kilo. In animals which had received the smallest dose, the blood sugar was not significantly affected, but the blood urea rose to some 50-100 per cent within a few hours and then fell to normal within less than three days.

Of the two animals which had been given 25 mgm. per kilo survived and the other died. Both animals showed a marked rapid rise of almost 100 per cent. in the blood sugar within two hours after injection, with an almost equally rapid fall to normal. There was no further variation or suggestion of hypoglycaemia for a further period of 20 hours. In each case the blood urea rose rapidly to a maximum within a little more than one day. In the animal which recovered the figures gradually returned to normal, and in the one which died the blood urea figures remained high until the time of death.

Of the two animals which were given the largest dose, viz 27.5 mgm. per kilo one collapsed and died within five minutes, but the other after an immediate collapse, recovered completely. This animal proved highly resistant to the toxic effects which might be

expected from such a large dose. There was no evidence of hepatic injury the rise of blood urea was *not* very great and there was no increase in blood sugar.

Finally two rabbits were given 5 mgm. per kilo of diamidino stilbene on each of six successive days. In these no significant changes in blood sugar or urea were observed. II 1

HAWKING (Frank) Concentration of Bayer 205 (Germanin) in Human Blood and Cerebrospinal Fluid after Treatment.—*Trans Roy Soc Trop Med & Hyg* 1940 June 27 Vol. 34 No 1 pp 37-52. With 4 figs.

This paper describes an investigation into the concentration of Bayer 205 found in the blood and cerebrospinal fluid of sleeping sickness patients who had been treated with this compound at Kahama in Tanganyika and at Gatau in Nigeria. The method employed was that described by DANGERFIELD GAUNT and WORMALL [this *Bulletin* 1938, Vol. 35 p 714]. The author summarizes his results as follows —

1 By means of the Wormall test estimations were made on the concentration of Bayer 205 found in the plasma of African sleeping sickness patients who had been treated with this compound. Big variations were found between one individual and another.

2 In persons who had received a single intravenous dose of 1 gramme the average concentration was about 3 mg per 100 ml. after two days and about 0.8 mg. after nine days.

3 In persons who received courses of four doses the concentrations reached depended more upon the individual peculiarities of the patient than upon the spacing of the doses. One day after the fourth dose the concentration in the blood ranged from 4 to 15 mg per 100 ml. After courses of five or six doses Bayer 205 could be demonstrated in the blood of some patients up to eight or nine months later in other patients it had disappeared within five months.

4 Estimations were made on the cerebrospinal fluid. Although Bayer 205 was present in the plasma of these patients in considerable concentrations, it did not penetrate into the fluid in sufficient amounts to be detected by the chemical test.

5 Since individuals vary so greatly in their tendency to retain Bayer 205 in their blood it is strongly recommended that the treatment of European cases of sleeping sickness be controlled by chemical estimations.

W Y

DUBOIS (A.) & KOHN (I) A propos du mécanisme d'action du Bayer 205 sur les trypanosomes. [The Mechanism of the Action of Bayer 205 on Trypanosomes].—*Ann Soc. Belge de Méd Trop* 1940. Mar 31 Vol 20 No. 1 pp 51-58.

In giving a brief summary of previous work on this subject the authors draw attention to the observation of the reviewer and his colleagues that the trypanocidal action of Bayer 205 is practically nil *in vitro* within 24 hours, and that of JANCsó that it is but slight after 48 hours. Jancsó explained the fact that Bayer 205 sterilizes a mouse in 24 hours on the hypothesis that the drug opsonizes the

formation of immune-body, thereby contributing to the immunity produced by the drug itself [this *Bulletin* 1938 Vol. 33 p. 657].

The present authors examined the subject in the case of guineapigs given a prophylactic dose of the drug and subsequently subjected to the bites of infective *Glossina*. They were unable to obtain any definite support for Duke's hypothesis.

III In this paper the authors consider the question whether infected guineapigs cured by a dose of 0.025 gm. of Bayer 205 are protected against reinfection for a longer period than are normal guineapigs which have received this dose of the drug. Details of the experiments are summarized in a table. One guineapig was protected for only 70 days, one for about a year and the remaining three animals for about 200 days. Two monkeys similarly treated both became infected when subjected to the bites of infective tsetse about 100 days later. In another series of experiments 5 guineapigs were treated in the same way and their resistance to reinfection was tested after various periods, by inoculation of infected blood instead of by the bites of infective tsetse; most of the animals were found to be susceptible in about 100 days. From this work the authors conclude that the relative immunity of cured animals, although it may exist, manifests itself only in a small number of individuals and is transient.

It is noted that the trypanosomes which were successfully re-introduced after variable intervals into the cured animals retained their power of evolution in *Glossina*, e.g. one guineapig reinfected 200 days after cure was bitten by 130 clean *Glossina* and 14 of these became infected.

IV There seems no doubt that Bayer 205 is a prophylactic of the first order and it was hoped that by the use of the drug it might be possible to destroy the human reservoir of the virus in a limited region for a period sufficiently long for the development of a clean stock of tsetse. But this hope has not been realized for various reasons, viz., the duration of protection was shorter than the life of the fly, the virus was introduced from surrounding districts and perhaps from animals, especially pigs, and probably certain natives escaped the prophylactic dose.

In a previous note it has been shown that a dose of 0.025 gm. per kilo may not protect longer than 43 days. Increasing the dose or the administration of a second dose at a week's interval does not materially improve things.

In infected animals and man it has been frequently observed that when a cure is not obtained, the trypanosomes may become so scanty as to escape observation and nevertheless are capable of infecting *Glossina*. One of the late results of massive prophylactic injection with Bayer 205 in an endemic area is that the appearance of the endemic seems to have changed, in that among the cases the proportion of those in the advanced stage is increased. Illustrations are given. It is however necessary to keep in mind that cryptic or inapparent infections may occur naturally in the absence of such prophylaxis.

From all this work the authors reach certain definite conclusions:—

1 In order to avoid the danger of masking the evolution of the disease the whole population should first of all be carefully examined and the infected treated.

2 The optimum prophylactic dose is probably 0.025 gm. per kilo. (1.25 to 1.5 gm. for an adult of 50 to 60 kilo.) The dose should be repeated after three months.

3 Particular care should be taken at the end of the 3 months when the second dose is being given to discover cases of infection.

4 Reasons are given why it is desirable to repeat the prophylactic injections at three-monthly intervals.

IV Y

VAN DEN BRANDEN (F) Giftigheidsproef van Germanine (Bayer 205 en gelijksoortige producten (309 Fournau of Morany) Belganyl) [Toxicity Tests in the Case of Germanin and Allied Products].—*Ann Soc Belge de Méd Trop* 1940 Mar 31 Vol. 20 No 1 pp 91-92.

The author lays down that if 5 mice of 20 gm. weight be injected intravenously (and slowly) with a 5 per cent solution of Germanin or allied compound in doubly distilled water in a dose of 0.40 gm. per kilo not more than two of the animals should be dead within 6 days.

IV Y

SICÉ (A) La prophylaxie de la trypanosomiasse humaine et le traitement des trypanosomés au Soudan français. [The Prophylaxis and Treatment of Human Trypanosomiasis in French Sudan].—*Ann de Méd et de Pharm Colon* 1939 Oct.-Nov.-Dec. Vol 37 No 4 pp 879-818

Sleeping sickness occurs over a large band of the Southern portion of French Sudan. The area of greatest endemicity is along the Niger and its tributaries, which constitute the seasonal haunts of the fly. Other areas infected are South of Bamako along the Niger and its tributaries and certain tributaries of the Senegal [this *Bulletin* 1940 Vol. 37 p 9]. Details are given in a series of tables of the incidence of the disease in various parts of the colony.

In a previous paper the author and TORRÉSI [this *Bulletin* 1939 Vol. 36 p 669] have referred to the effect of synergic treatment in cases of sleeping sickness in French Sudan. As a rule blood and gland infections were treated with tartar emetic and atoxyl whilst in cases showing signs of meningeal involvement the combination moranyl tryparsamide was used. In the present paper Sicé gives details of a considerable number of cases treated in this manner at the sleeping sickness centre at San.

The author first deals with a series of 36 cases in the meningo-encephalitic stage of the disease these patients were treated synergically with tartar emetic and tryparsamide. In all the cerebrospinal fluid was considerably changed when treatment commenced, and after treatment it had become normal, or almost so in all cases except one. Details are given regarding two very severe cases which terminated fatally.

Another group of patients treated in this way were 37 cases exhibiting a simple cellular reaction in the cerebrospinal fluid all did well. A third group consisted of 22 patients in an early stage here again all did well.

The paper terminates with an account of similar treatments at another sleeping sickness centre at Ségou.

IV Y

KOPP (Israel) & SOLOMON (Harry C.) The Untoward Reactions of Tryparsamide.—*Amer Jl Syph* 1940 May Vol. 24 No. 3 pp 265-283 With 3 figs [23 refs]

The authors state that although tryparsamide has been in general use for 16 years little discussion has appeared concerning its untoward

manifestations or toxic reactions apart from its effect on the visual apparatus. In the present paper they give an account of the toxic manifestations observed by them in the period 1923-1939 during which they have given 43,308 injections to 829 patients. The average dose administered has been approximately 3 gm. and continuous courses of treatment year after year have been given.

The complications due to the use of trypanamide may be divided arbitrarily as follows —

- " I. Visual
 - 1 Optic atrophy
 - 2 Toxic amblyopia
- II Nitritoid or allergic
- III Gastrointestinal
 - 1 Nausea, vomiting, diarrhoea, cramps
 - 2 Jaundice
- " IV Skin
 - 1 Dermatitis
 - 2 Urticaria
 - 3 Pruritus
- " V Cerebral
 - 1 Headache, dizziness, drowsiness, confusion, coma, aphasia
 - 2 Convulsions
 - 3 Mental symptoms emotional instability hallucinations
- VI Other nervous system symptoms
 - 1 Peripheral neuritis (?) lancinating pains, loss of bladder control
- VII Other types
 - 1 Chills, fever, tingling in the extremities, weakness."

It is not possible to classify some reactions in any one category as there may be a mixture of signs, such as gastrointestinal disturbances followed by skin lesions or a nitritoid reaction with urticaria. The yearly number of untoward reactions in the authors' series of cases varied from 4 to 29 per 1 000 injections.

Visual disturbances—These are already well known and nearly all observers agree that they are most apt to occur during the first 8 to 12 injections of the drug. In the literature these disturbances have been grouped under two headings (a) subjective and (b) objective. The incidence of visual disturbances in the authors' cases was 4.5 per cent. and the incidence of optic atrophy 1.2 per cent. Both values are low when compared with others in the literature. The type of syphilitic lesion present in the patient may play some part in the development of optic atrophy. Thus of 17 patients with general paresis who developed visual disturbance optic atrophy resulted in only 4 (24 per cent.) whereas of 14 patients with tabes dorsalis and taboparesis optic atrophy developed in 6 (43 per cent.). Six patients with meningovascular syphilis developed no permanent damage.

The authors' findings bear out the fact that when visual disturbances occur during the first 10 injections of trypanamide, the drug should be permanently omitted. In 13 patients in whom the drug was continued at this time optic atrophy resulted in 6 patients (46 per cent.) whereas in 16 patients in whom the drug was immediately omitted, optic atrophy resulted in only 3 cases (19 per cent.). When, however, visual disturbance occurred after the administration of 17 to 61 injections, optic atrophy did not result even though trypanamide was continued in 8 of 7 patients and as many as 19½ injections were given to 1 patient.

The subjective complaints of the patients consisted of blurring and haziness of vision 'spots before the eyes' eyes went blind, and cloud over eyes. No lesions were discoverable in the fundus in most cases at the time of their complaints and perimetric examination showed either no change or some concentric or quadrantal constriction. The central vision acuity in most was normal and in a few diminished. Patients with visual complaints are not very apt to experience other types of reactions probably because the drug has been administered for only a short period and is in most cases immediately stopped after the visual complaint.

Nitritoid or allergic reactions—During the first five years, only one patient experienced repeated nitritoid reactions but since 1928 nitritoid reactions have occurred in each year with the exception of 1932. From 1922 to 1937 the incidence of nitritoid reactions ranged from 0 to 3 per cent. These reactions usually appeared in patients who had shown other manifestations of sensitivity especially the gastrointestinal type of reaction. They were most apt to occur in those who had received considerable quantities of tryparsamide. The reaction occurred in the course of the first 10 injections in only 7 of the 41 patients who exhibited it and 31 of the patients had received more than 30 injections before they developed the reaction. The reactions varied from mild to very serious. Some patients recovered within 20 to 30 minutes without the use of adrenalin, but in others repeated doses of adrenalin were required.

Gastrointestinal reactions—This type of reaction is the most common experienced by patients sensitive to tryparsamide and was seen in 7 per cent. of 829 patients treated at the authors clinic. It usually occurs from 1 to 4 hours after the injection of the drug but may occur immediately. It consists of nausea, vomiting diarrhoea and abdominal cramps, occasionally accompanied by profuse perspiration pallor of the skin tingling in the finger tips suffusion of the face emotional changes such as apprehension and weeping dizziness weakness, chills and fever.

Jaundice—This is usually of the benign type brief in duration with little symptomatology and no sequelae. Of 30 instances occurring amongst the authors patients 10 developed during the first 10 injections of the drug and 24 during the first 25 injections.

Skin—These lesions have consisted in discrete or multiple desquamative patches on an erythematous base red blotchy papules and small purpuric-like areas. When the drug was stopped they disappeared, except in one case in which residual pigmented areas resulted. Urticarial lesions were observed in 5 patients.

Cerebral—Dizziness occasionally occurs immediately or shortly after an injection of tryparsamide it may be accompanied by nausea vomiting or weakness. Coma with a rise of temperature was seen in one patient. Convulsive seizures occurred in 4 patients immediately after the injection. In 3 patients an acute hallucinosis in the auditory or visual spheres accompanied by considerable hyperactivity and excitement followed the injection. A number of patients exhibited emotional disturbances. In some patients with tabes dorsalis exacerbation of the lancinating pains occurred. In 3 patients foot-drop was observed during the tryparsamide therapy. Tremors of the facial muscles and of the fingers may be exaggerated in a few patients there was a temporary loss of bladder control, and tingling of the fingers and toes was also seen.

received a report giving the fate of these 11 animals. It appears that 6 (54 per cent) were still alive of the 13 control animals, only 1 (7 per cent.) survived. The author believes that this technique is capable of improvement, as he probably introduced the animals into the tsetse area too early.

The other method by which he attempted to produce immunity consisted in the inoculation of dried dead trypanosomes. The results were not so good, as only 2 of the 9 animals so treated survived.

The report which Schilling received on May 1st from Tanganyika contains other interesting information. It appears that the immunized animals had 13 calves. Three of these calves were used for other purposes and of 4 others there is no information but the remaining 6 grew up in the tsetse area and flourished. It would seem, therefore, that the offspring of immune mothers exhibit a certain resistance which enables them to survive in tsetse-infested regions. [See also this *Bulletin* 1935 Vol 32, p. 714 1936 Vol 33 p 684 1937 Vol 34 pp 125 554] W 1

HOARE (Cecil A.) Studies on the Behaviour of *Trypanosoma crassii* in Tsetse-Flies with Special Reference to its Phylogeny—*Parasitology* 1940 Apr Vol 32 No 1 pp. 105-121 With 1 map [36 refs]

The author summarizes his studies on *Trypanosoma crassii* as follow —

In view of the morphological similarity of *T. crassii* and *T. brucei* including the sporadic occurrence of marked polymorphism in the first-named species, the hypothesis is advanced that *T. crassii* may have originated from *T. brucei* by the introduction of the last named species into localities free of *Glossina* and its subsequent propagation by direct passages.

The possibility of contact between the mammalian host of *T. crassii* on the one hand, and *Glossina* and tsetse borne trypanosomiasis, on the other is shown to exist in the Anglo-Egyptian Sudan, thus pointing to the source from which *T. crassii* in that country may have originated and providing circumstantial evidence in support of the hypothesis.

Attempts were made to discover whether *T. crassii* is capable of developing in *Glossina*. A total of 563 flies were fed on infected mice and examined at periods from 6 hr to a fortnight following the infective feed. The results were entirely negative — not only is the trypanosome incapable of establishing an infection in the fly but the majority of flagellates perish and are digested during the first hours after ingestion by the insect.

The behaviour of *T. crassii* in tsetse is shown to be similar to that of non-transmissible strains of trypanosomes of the *brucei* group after prolonged maintenance by direct passages in the mammalian hosts, and is therefore also in keeping with the hypothesis. W 1

KLIGLER (I. J.) OLITZKI (L.) & KLIGLER (Helen) The Antigenic Composition and Immunizing Properties of Trypanosomes.—*J. Immunology* 1940 Apr Vol 33 No 4 pp. 317-331

In a previous paper the authors have reported the results of analysis of the antigenic composition of *Trypanosoma crassii* (this *Bulletin* 1937 Vol 34 p 133). In the present paper these studies have been extended, and, for purposes of comparison, antigenic analyses have also been

made of the non pathogenic *T lewisi*. The technique adopted was the same as that described in the previous paper. The authors summarize their results as follows —

Data are presented on the antigenic composition of *Tr evansi* and *Tr lewisi* and on the toxic and immunogenic properties of the various components of the cell.

Tr evansi has a higher lipoid and lower residue content than *Tr lewisi*.

The lipoid and protein fractions when injected into animals produce an encocytosis and a rise in temperature.

None of the fractions on injection produces a hypoglycaemia or a depression of temperature as is the case with toxic fractions from bacterial cells.

The various antigenic fractions of *Tr evansi* fail to induce any immunity in rats.

The residue of *Tr lewisi* possesses some immunizing properties — this is not the case in *Tr evansi*.

Injection of whole dead trypanosomes (*Tr evansi*) produces a partial and transient immunity.

Treatment with a drug of an active infection of *Tr evansi* results in a more solid and durable immunity against a reinfection with the homologous strain — this immunity is extremely variable in individual rats in some lasting 2 or 3 months and in exceptional instances as long as 9 months.

The significance of the cell composition in relation to the antigenic and pathogenic properties of the parasite is discussed and a comparison made with the acid fast bacteria also having a high lipoid content.

B Y

STONE (Wm S) & THOMPSON (Arvo T) A Method for preserving *Trypanosoma equiperdum* — *Science* 1940 Apr 5 Vol. 91 No 2362. p 344

A method is described whereby *Trypanosoma equiperdum* has been kept viable and infective for a period of 14 months by freezing infected rat blood. The procedure was briefly as follows. Infected rat blood was citrated or defibrinated and about 5 cc introduced into a 50 cc. sterile Pyrex vial. The vial was stoppered with a rubber bung through which a glass rod one foot long had been passed. The vial was then lowered into a freezing bath of dry ice and alcohol and rapidly twirled during and after submersion by rolling the glass rod between the palms of the hands. The blood froze almost instantaneously in the bottom of the vial. The bung and rod were removed and replaced by a new sterile aproned rubber cork, the apron of the cork being turned down and securely fastened with rubber bands. The vial was then allowed to submerge in the dry ice alcohol bath.

The bath used was a wide mouthed thermos bottle of five gallons capacity into which two gallons of ethyl alcohol and twenty pounds of dry ice had been placed. Additions of dry ice were made once or twice weekly to maintain the bath.

The viability of the trypanosomes was tested after 46 days and after 14 months by removing the vials from the dry ice bath and allowing the contents to thaw either at room temperature or by submersion in cold tap water. The blood when thawed, was haemolysed, but actively motile trypanosomes were present and on inoculation into young rats they produced fatal infections.

W Y

are mentioned the stimulus of artificial light attractive qualities of the sweat and hunger. Specimens have been found, in a bed for example engorged with blood. Experimentally it has been shown to be infectible with *T. cruzi* and 72 hours after an infective meal it has been seen to contain metacyclic and tritrichial forms. The article contains a useful list of 23 Triatomidae found naturally infected with the trypanosome and the first describer and the country in which it occurs—a second list of 42 insects, bugs ticks, etc. which have been demonstrated to be capable of infection experimentally. [It will be interesting to note in course of time whether any of the second list come to be transferred to the first (see also this *Bulletin* 1939 Vol 36 p 754).] H H S

GALLARDO (Vicente P.) Observations on the Sting of *Triatoma rubrofasciata* de Geer.—*Jl Philippine Med Assoc* 1940 Jan Vol 20 No 1 pp 35-36 With 1 fig

Triatoma rubrofasciata is usually found on the back of plant leaves near a house, and in dark corners or under the beds inside a house. It is nocturnal and usually regarded as harmless and it is not suspected of causing harm because it bites while the subject is asleep and disappears again before daybreak. The patient on waking complains of burning pain in some exposed part—arms legs cheeks—not severe and a circular swelling from 3 to 10 cm in diameter is seen with a single small papule or vesicle at the centre. Some persons, the more susceptible complain also of urticaria and pruritus, with malaise but no fever. In children the symptoms may be more alarming with fever restlessness and more extensive swelling resembling erysipelas but they clear up in less than 24 hours. Rubbing of ordinary washing soap on the swelling brings speedy relief (or local application of alkali?) or for the more susceptible injection (amount not stated) of 10 per cent calcium gluconate. H H S

MAZZA (Salvador) TOMAR (R. Gajardo) & JORDA (N. E.) Investigaciones sobre Triatomidae. *Mepraia* novum genus de Triatomidae *Mepraia spinolae* (Porter) 1933 nov comb. redescrípción de ♂ y descripción de ♀. [*Mepraia*, a New Genus of Triatomidae. Redescription of *M. spinolae* Male and Female.]—*Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina (Uruguay). Publicación* No 44 1940 30 pp With 27 figs.

MAZZA (Salvador) GIORDANO (Jose J.) & DOBLADIZ (Miguel J. L.) Investigaciones sobre la enfermedad de Chagas. B II. Forma aguda de enfermedad de Chagas por contaminación de picadura cutánea. [An Acute Case of Chagas's Disease Infection by Bites.]—*Universidad Buenos Aires. Misión de Estudios de Patología Regional Argentina (Uruguay). Publicación* No 43 1940. pp 36-40 With 3 figs.

A child of 2½ years, in San Juan, living in a poor but highly infested with *Triatoma infestans* was bitten between the left eyebrow and the temple. Within 24 hours there was swelling and oedema followed by enlargement of the pre-auricular mastoid and cervical glands—the enlargement was present when the patient came under observation three weeks after the initial bite. Tachycardia was still marked 7 months after and a xenodiagnostic test was carried out with larvae of *T. infestans* and the result was positive. H H S

MAZZA (Salvador) **BASSO** (Germinal) & **BASSO** (Redento) Investigaciones sobre la enfermedad de Chagas. B V Forma aguda severa oftalmoganglionar de enfermedad de Chagas observada en Media Agua (San Juan) [Severe Acute Case of Chagas's Disease with Adenitis].—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) Publicación No 43* 1940 pp 48-52. With 2 figs.

The patient was a young woman of 16 years of San Juan living in a *Triatoma* infested dwelling. Her illness began with burning sensation and some pain at the outer angle of the left eye and over the face on that side with chills fever and headache. There was considerable oedema the upper eyelid was white and swollen the lower violaceous and congested there was intense injection of the conjunctiva a pre-auricular gland enlarged to the size of a chickpea hard and painful. When the blood was examined (thick drop) on the 18th day *T. cruzi* was seen. There was sinus arrhythmia and some interference with intraventricular conduction. The oedema persisted for over 3 months before disappearing the cardiac changes remained. *H H S*

MAZZA (Salvador) & **MILARA** (Salomon) Investigaciones sobre la enfermedad de Chagas. B VIII Dos adultos con formas severas de enfermedad de Chagas uno con exantema (*exquisitripanide*) de la Prov de San Juan [Two Severe Cases of Chagas's Disease, One with a Rash].—*Universidad Buenos Aires Misión de Estudios de Patología Regional Argentina (Jujuy) Publicación No 43* 1940 pp 59-72. With 8 figs. & 2 charts

The reason for mentioning this article is that one of the patients a Spaniard 34 years of age on the fifteenth day of his illness developed a rash. On the chest and abdomen were sharply defined red spots from the size of a pin's head to that of a 5-centavo coin mostly discrete but in places running together to form a patch as large as the palm. Spots were visible also on the legs and a few on the shoulders. Three days later the individual spots varied in size to that of a rice grain. They were not infiltrated and disappeared momentarily on pressure. There was no pain nor itching. On the 20th day of disease and the 7th of the rash the spots became paler and had faded altogether in another 7-10 days i.e. the eruption was present for 14-17 days there was no desquamation. Scrapings from a spot did not reveal any trypanosomes. [This is so far as the abstractor is aware the first record of an exanthem in Chagas's disease.] *H H S*

CARINI (A.) Considerações sobre a moléstia de Chagas. Palestra realizada no Instituto Biológico em 8 de Março de 1940 [Chagas's Disease Points raised at a Conference].—*Arquivos de Biol. S. Paulo* 1940 Apr Vol. 24 No 226 pp 77-84. With 5 figs.

CHOLERA.

PRÉCIS OF ABSTRACTS IN THIS SECTION

LAL (p 717) has studied the epidemiology of cholera in Bengal the trend of mortality in many homogeneous districts is definitely declining. There was little evidence that a critical level of absolute humidity is a determining factor in epidemics.

In further studies LODENKÄMPER (p. 717) has found no support for the original contention that vibrios undergo a developmental cycle.

GENEVAY (p. 717) has succeeded in dissociating the cholera vibrio into smooth and wrinkled colonies by the use of free chlorine, the technique of which is described. He (p. 717) has obtained comparable results by the use of phenol in place of chlorine, and indicates (p. 718) in what respects the vibrios of the wrinkled colonies differ from those of the smooth. The wrinkled colonies may be re-converted to the smooth type and are therefore not mutations, but variants.

LAHIRI *et al.* (p. 718) show that an Inaba strain retained its viability in water for periods varying from 1 hour to 18 days, depending on the source and treatment of the water. Autoclaved and filtered waters gave longer durations than raw waters.

BAARS (p. 718) has continued his investigations on the fermentation of glucose by the cholera and El Tor vibrios. LINS (p. 719) has investigated the utilization of certain amino-acids by the cholera and El Tor vibrios. AIDA (p. 719) shows that there is good agreement between the haemolytic and milk coagulating activities of young strains of cholera and cholera-like vibrios.

WHITE (p. 719) has found that the gelatinous intercellular substance characteristic of cultures of rugose vibrio variants contains a hapten reacting specifically with whole rugose cultures and with antisera to certain rugose extracts. He (p. 720) describes the antigenic properties of a heat-labile somatic protein obtained from vibrios. Injection of this into animals provokes, in a proportion of cases, the formation of precipitins and it is thought that the substance has a somatic rather than a flagellar origin.

RAYNAL *et al.* (p. 720) show that the activity of trichloroacetic acid extracts of cholera vibrios was directly correlated with their virulence and that the best antigenic results were obtained when strains recently isolated from severe cases of cholera were employed. DAMBOVICIANSU and BARNER (p. 721) describe the properties of complete antigen extracted from cholera vibrios.

PACHECO and PÉRES (p. 721) found that rhusin diminished the bacterolytic action of anticholera serum.

MERTENS and BEUKES (p. 721) found that centrifuged supernatant fluid from suspensions of El Tor, Celebes and some cholera strains was haemolytic. Acetone-alcohol precipitates from these suspensions and from nutrient broth in which the vibrios had been cultivated were non-haemolytic for cholera, haemolytic for El Tor and variable for the Celebes strain.

MARRAS (p. 722) regards the El Tor vibrio as a contaminating non-pathogenic, non-epidemic organism local to the Hedjaz. He states that it possesses a non-specific O agglutinogenic group identical with the Inaba vibrio. He does not consider it to be identical with the Celebes vibrio. DE VOGEL (p. 723) states that in Celebes during 1938 no vibrios which would agglutinate with cholera serum were found in a large number of examinations and that no El Tor vibrio has ever been isolated outside the regions attacked in the recent peculiar epidemic of cholera. Since the last case in April 1938 no El Tor vibrio has been isolated in the affected region from cases of illness resembling cholera.

IDE (p 723) points out that healthy cholera carriers from China have in the past entered Japan passengers are therefore now not allowed to land until the results of stool examinations are known

C II

CALCUTTA ANNUAL REPORT OF THE ALL INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH 1939 [Cholera pp 13-21 LAL (R B)]

The epidemiology of cholera in Bengal has been studied on the basis of homogeneous cholera districts. An endeavour was made to classify such districts into endemic and non-endemic areas having varying degrees of epidemicity. The endemic regions lie mostly along the lower reaches of the river Hooghly and non-endemic regions show a low degree of epidemic visitation. In many of these homogeneous districts also it was found that the trend of cholera mortality was definitely declining. In the matter of forecasting cholera little evidence was forthcoming in support of the theory that a critical level of absolute humidity was a determining factor. W F Harvey

LODENKÄMPER (H) Entwicklungstudien an Vibrionen II Mitteilung [Developmental Cycle in Vibrios].—*Zent f Bakt I* Abt Orig 1940 May 3 Vol 145 No 7 pp 393-402. With 3 figs [14 refs]

Further studies on this subject of a cycle of development in bacteria [this *Bulletin* 1939 Vol 36 p 371] in contrast to those in the first communication showed no attainment of a stable phase and no transformation to normal vibrio forms. W F H

GENEVRAJ (J) Dissociation du vibron cholérique sous l'action du chlore [Dissociation of the Cholera Vibrio by Chlorine].—*C R Soc Biol* 1940 Vol 133 No 1 pp 66-68

After preliminary experimentation the dose of free chlorine in excess (by titration) adopted was 2.6 mgm. per 10 cc of ordinary peptone water pH 7.4 sown with 5 drops of cholera suspension (1 loopful of a 16-hour culture in 10 cc. peptone water). The chlorine was allowed to act for 45 minutes when 5 drops from each tube were sown in peptone water and incubated 16 hours at 37°C. Again 5 drops of the culture were added to 10 cc. peptone water containing 2.6 mgm. excess chlorine. The process was repeated and repeated. The result from the third passage was the appearance on solid media of small dry opaque wrinkled colonies exactly like those described formerly [this *Bulletin* 1932, Vol. 29 p 684] alongside the common translucent smooth cholera colonies. The wrinkled colonies were shown to be those of the true cholera vibrio and they showed no tendency even after 15 passages to increase in number. Thus success has been achieved in dissociating the cholera vibrio to give smooth and wrinkled colonies. W F H

GENEVRAJ (J) Dissociation du vibron cholérique sous l'action de l'acide phénique [Dissociation of the Cholera Vibrio by Phenol].—*C R Soc Biol* 1940 Vol 133 No 2. pp 196-197

The separation of cholera vibrio colonies subjected to the action of phenol into two types—smooth transparent and dry wrinkled—was (1931)

effected by the fifth passage. Thus the action of phenol was comparable with that shown to occur with chlorine and with the same technique. W F H

GINCEVRA (J) Etude des vibrions cholériques provenant des colonies lisses et plissées obtenues par l'action du chlore et de l'acide phénique [Cholera Vibrios from Smooth and Wrinkled Colonies obtained by the Action of Chlorine and Phenol].—*C. R. Soc Biol* 1940 Vol. 133 No 2. pp 197-200

The two types of colony smooth and wrinkled, had the same differential characters, whether the dissociation had been brought about by chlorine or by phenol. Vibrios from smooth colonies had all the characters of the strain from which they had been derived. The vibrios of wrinkled colonies on the other hand, differed from those of the original in macroscopic characters and in the increase of proteolytic, milk-coagulating, haemolytic, haemagglutinating and chlorine-resisting power. It was possible also to bring the wrinkled colony strain back by repeated passages to the smooth colony type. Thus the wrinkled type is but a variant and not a mutation from the original strain.

W F H

LAHRY (M. N.) DAS (P. C.) & MALIK (K. S.) The Viability of *Vibrio cholerae* in Natural Waters.—*Indian Med Gaz* 1939 Dec. Vol 74 No 12. pp 742-744

Much more stringent tests are applied nowadays for the diagnosis of the true cholera vibrio. It was thought desirable, therefore to test once more the viability of the cholera vibrio in natural waters. A freshly isolated vibrio of Inaba type was used and four types of water were put to trial—(1) Raw untreated (2) raw autoclaved (3) filtered raw and (4) filtered raw autoclaved. The results vary according to the source of the water tested from as little as 1 hour up to 18 days. Autoclaved and filtered (L3 candle) samples of water gave longer durations of viability than raw waters. W F H

BAARS (J. K.) Vergelykend onderzoek van *V. cholerae* and *V. El Tor* glucose-dissimilatie. [Comparison of Glucose-Dissimilation by Cholera and El Tor Vibrio].—*Geneesk. Tijdschr v. Nederl. Indië* 1940. Feb 6. Vol. 80 No 6 pp 334-348. With 2 figs. English summary

The present work carries the investigation of the fermentation products of glucose by cholera and El Tor vibrios further under both aerobic and anaerobic conditions with Difco peptone as the source of nitrogen [this *Bulletin* 1939 Vol 36 p 372]. Both vibrios split the glucose molecule aerobically and anaerobically into two C_2 molecules, part of which is recovered as lactic acid. The remainder is transformed further to formic acid and probably acetaldehyde, which latter may be converted into ethyl alcohol and acetic acid (Cammaro) or oxidized to acetic acid or condensed to succinic acid. Further the acetaldehyde may also serve, under aerobic though not under anaerobic conditions, as a source for the formation by the El Tor vibrio of acetyl-methyl carbinol or 2-3 butylene glycol. The El Tor vibrio moreover can oxidize a considerable part of the formic

acid to carbon dioxide a power which is possessed by the cholera vibrio to a much less degree and not at all under anaerobic conditions. The power of direct formation of succinic acid from peptone is possessed much more strongly both under aerobic and anaerobic conditions by the cholera vibrio than the El Tor vibrio. Aerobically the El Tor vibrio converts considerable amounts of the formic acid into carbon dioxide while the cholera vibrio converts but little. Under anaerobic conditions only the El Tor vibrio produces any carbon dioxide. As a whole the El Tor vibrio ferments glucose more energetically than the cholera vibrio. W F H

LIES (Franz) Typendifferenzierungsversuche am *Vibrio cholerae* und seinen Verwandten [Type Differentiation of Cholera Vibrios and their Allies].—*Zent f Bakt I Abt Orig* 1939 Dec. 4 Vol. 145 No 2 pp 106-109

The basis of the type differentiation investigated was the capability of different strains to utilize certain amino-acids. For this purpose three media were used—(1) Asparagin phosphate (2) Alanin phosphate-ammonium lactate and (3) d Valin phosphate. Both among cholera and El Tor strains there were found some which were amino-acid positive and some which were negative. W F H

BREUVAKS (H) Sur les ferments protéolytiques du *Vibrio cholerae* et du *Vibrio El Tor* [The Proteolytic Ferments of the Cholera and El Tor Vibrios].—*Annales van Leeuwenhoek* 1939/1940 Vol. 6 No 1 pp 48-55 With 2 figs

[Previously abstracted in this Bulletin 1939 Vol. 36 p 899]

AIDA (Toshiro) Beiträge zu den Kenntnissen der biologischen Eigenschaften von Choleravibrien und anderen ähnlichen Vibrien. I Teil Ueber die Beziehungen zwischen den hämolytischen und den kühmlich koagulierenden Wirkungen der betreffenden Bazillen. [Correlation between Haemolytic and Milk-Coagulation Action of Cholera and Cholera-like Vibrios].—*Taiwan Igakka Zasshi (Jl Med Assoc Formosa)* 1939 Dec. Vol. 38 No 12 [In Japanese pp 1737-1745 [59 refs.] German summary p 1746]

Good agreement between the haemolytic and milk coagulating activities was found to exist in young strains of both cholera and cholera like vibrios but this agreement was not maintained in about 10 per cent of the old strains. Repeated subculture appears to weaken both activities. W F H

WHITE (P Bruce) The Characteristic Haptene and Antigen of Rugose Races of Cholera and El Tor Vibrios.—*Jl Path & Bact* 1940 Jan. Vol 50 No 1 pp. 160-164 [16 refs.]

In a previous investigation on rugose vibrio variants the question of the serological activity of the gelatinous intercellular substance characteristic of such cultures was left open. It has been found to be a haptene reacting specifically with whole rugose cultures and with antisera to certain rugose extracts. The author's summary is as follows—From S R and ρ rugose cultures of cholera and El Tor

El Tor and Celebes vibrios. As usual, when a series of strains in any given group of organisms is tested, some one or two exceptional strains are found, which place a check on any sweeping generalization. It is obvious likewise that if any generalization at all on haemolytic potency of vibrios is to be attained, it can only be by close adherence to uniform methods of testing. The authors' summary of their results is as follows:—(1) The centrifuged supernatant fluid of thick suspensions of all strains of El Tor, most strains of Celebes, and some strains of cholera was haemolytic and the haemolysin was thermostable. (2) The precipitate obtained from the supernatant fluid with 96 per cent. acetone alcohol showed no haemolytic character in the case of cholera, little in the case of Celebes, and definite haemolytic power in the majority of El Tor strains. When haemolytic power was present it was not altered by heating. (3) Nutrient bouillon worn with vibrios, incubated for one or two days and centrifuged, showed the supernatant fluid, acetone-alcohol precipitate to be non-haemolytic for cholera and both strongly haemolytic and thermostable for all strains of El Tor and Celebes.

B. F. H.

MARRAS (F. M.) Sul vibrione El Tor. Ricerche sierologiche riguardo al gruppo agglutinogeno specifico O ed al gruppo agglutinogeno non specifico O⁺ del v. El Tor. L'epidemia delle Isole Celebes è dovuta al v. El Tor? Valore della reazione di Voges-Proskauer nell'identificazione dei vibrioni. [Specific and Non-Specific Agglutinogens of V. *El Tor*. Value of Voges-Proskauer Reaction. The Celebes and El Tor Vibrios.]—*Ann. d'Igiene* 1940 Jan. Vol. 50 No. 1 pp. 1-11.

Repeated examinations of pilgrims during the years 1936 to 1939 have shown that El Tor vibrios can be found in normal dejecta and in the dejecta of individuals suffering from ordinary diseases. The type of organism is invariably the same and, according to the author, is a local (Hedjaz) contaminating, non-pathogenic non-epidemic organism. When it has been isolated on the collective or pooled system, it has often been found difficult to track down subsequently the particular carrier of the organism in the quarantine camp. This is explained as due to its rapid disappearance from the intestine during stay in camp. If carriers are to be detected, examination should

The author rejects the possibility that the Celebes vibrio is identical with *V. El Tor* because the latter is non-pathogenic and does not produce epidemics.

W F H

DE VOGEL (W) Au sujet de l'épidémie cholérique de Célèbes (The Cholera Epidemic of Celebes).—*Bull. Office International d'Hyg. Publique* 1940 May-June Vol. 32. No. 5-6 pp 556-559

The discussion regarding the peculiar epidemic of cholera in the island of Celebes still continues and this communication represents question and answer on certain particular points raised. The last of these questions had reference to the examination of persons in good health before and after the epidemic and to whether *El Tor* vibrio strains could be isolated in the non-infected zone of Celebes. It is answered as follows.—During 1938 examinations were made of 2 284 samples of faeces from different parts of Celebes for dysentery bacilli in the course of routine work and the opportunity was taken at the same time of examining for vibrios. Not a single vibrio which agglutinated with cholera serum was found. No *El Tor* vibrio has ever been isolated outside of the regions attacked. Moreover after the last case of *El Tor* cholera had occurred in April 1938 at Macassar no more *El Tor* vibrios were found by bacteriological examination of several cholera-like cases in the regions previously attacked.

W F H

IDE (Masanori) Anti-Cholera Campaign conducted in Japan in 1939.—*Jl. Public Health Assoc. Japan* 1939 Dec. Vol. 15 No. 12. pp 1-5

Cholera in China is epidemic every year and cholera in Japan occurs only by importation from China. As Japan is not more than 24 hours sea travel from China this is remarkable and must be considered a triumph for the quarantine service. In 1939 no actual cases were imported but cholera carriers were. These individuals were apparently in good health at the time of quarantine inspection. It was possible however to trace the carriers and isolate them at their destinations. This discovery of carriers led to the imposition of a new quarantine regulation by which instead of passengers being permitted to land on collection of their stools they were only allowed to disembark after the result of stool examination became known.

W F H

DAS (Bon Behary) The Treatment of Cholera.—*Med. Bull. Bombay* 1940 May 18 Vol. 8 No. 10 pp 348-362.

AMOEBIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

BOE (p 725) reports infection with *Entamoeba histolytica* in a woman in Norway. She had never left that country and had never complained of gastro-intestinal trouble. Although infection with *E. histolytica* is common in Palestine CANAAN and BLOMER (p 725) show that liver

years 239 were townfolk and 162 fellahin 204 were females and 186 males 362 were Arabs and 88 Europeans. Among them all 122 had *E. histolytica* (30.5 per cent.) 111 had *Ascaris*, 48 *Trichuris* 18 tapeworm only 152 had no parasites in their stools. Only 28.7 per cent. of those with parasites had any signs of chronic intestinal disturbance and nearly one-third of the positive had no intestinal symptoms whatever. Of those with *E. histolytica* only 5.2 per cent. gave the test for occult blood. Liver abscess is very rare in Palestine. In just over five years among 8,690 patients treated at the hospital, 2,960 had *E. histolytica* infection but only 11 cases of liver abscess were seen (0.37 per cent.) In spite of the numbers harbouring the amoeba those with amoebic dysentery are very few. The entamoebae can, therefore remain in the intestine for a time it may be long or short without giving rise to symptoms but all carriers should be treated as early as possible and until they are free. H H S

SEVERI (H A) Bacteriological and Parasitological Survey of Rats in Iraq.—*Trans Roy Soc Trop Med & Hyg* 1940 Apr 30. Vol 33. No. 6 pp. 653-657

During the routine examination of rats for evidence of plague in Bagdad the opportunity was taken of examining the blood for bacterial infections and the faeces for protozoa and helminths. There was an entire absence of salmonella infections of the blood but in the faeces *Entamoeba histolytica* and *E. coli* as well as *E. muris* are reported. It cannot have been an easy matter to differentiate *E. coli* and *E. muris* which are singularly alike. A table gives the complete results of the examinations. C M Wrenn.

WATFIELD (Gerald F) & CHIN (Ta Hsiung) Studies on the Control of Fecal-borne Diseases in North China. VII. The Epidemiology of the Parasitic Amoebae.—*Chinese Med. J.* 1939 Sept. Vol 56 No 3. pp. 265-286 [21 refs.]

In connection with the study of faecal-borne diseases in China the authors have carried out a large number of examinations from the point of view of amoebic infections, chiefly by *Entamoeba histolytica* in West Shantung. Various groups of individuals, both urban and rural comprising country families, soldiers, school-children, university students and hospital patients, were selected. The percentage of *E. histolytica* infections varied from 25.3 per cent. in the country family group to 4.3 per cent. in the hospital patient group. The high figure for the country family group, the result of a single specimen from each individual, appears to be the highest incidence on record. It is noted that various observers, of whom the reviewer was the first, have shown that the single examination reveals only a third of the infections disclosed by repeated examinations. Various recorded surveys for intestinal protozoa in China are reviewed and it is noted that contrary to expectation the incidence of infections in South China, where there is general use of fresh human faecal material for manuring vegetables is lower than in North China, where artificial manure are largely used. The difference may be due to the universal use of boiled rice in the south in place of the hand-contaminated cold bread stuffs in the north. On the other hand it may be a question of the type of water supply. There is, moreover a correlation between the incidence of amoebic and ascari infections. C M W

SCHOENLEBER (A W) The Food Handler as a Transmitter of Amoebiasis.—*Amer J Trop Med* 1940 Jan Vol. 20 No 1 pp. 99-108. [Summary appears also in *Bulletin of Hygiene*]

The author criticizes severely the experimental work of SAPERO and JOHNSON [see *Bull of Hyg* 1939 Vol. 14 p 746] and their conclusion that food handlers are of minor importance in amoebiasis transmission. At Aruba, an island off Venezuela are about 1 500 Americans living under conditions which preclude the transmission of infection from water flies sewage or soil contamination of food. They arrive direct from America, so their average amoebic infection rate is not more than 10 per cent. When the population was investigated after several days residence the results showed that 33 per cent. of the native population including cooks and servants were infected with *Entamoeba histolytica* and 25.57 per cent. of the American population. Active measures for the control of dissemination of infection by food handlers were put into effect but no other control measures. The percentage infected was reduced from 25.57 in 1935 to 12.69 5.70 and 1.92 in 1936 1937 and 1938 respectively. The author considers that food handlers are an important means of transmission.

W G Savage

BONNIN (H) & ARETAS (R.) Action sur *Entamoeba dysenteriae* en cultures de diverses substances et du sérum d'homme ayant reçu de l'émétine. [Action of Various Substances and of the Serum of a Man who had received Emetine on *Entamoeba histolytica* in Cultures.]—*C R Soc Biol* 1939 Vol 132 No 25 pp 577-579

By the use of human serum in medium for the growth of *Entamoeba histolytica* a more rapid multiplication is obtained. If serum from a person who has just completed a ten days course of emetine be employed culture is definitely hindered. The amoebae multiply less rapidly are less motile and are smaller. Subcultured into medium containing normal human serum the normal is again attained after two passages. Serum from an individual who had completed a ten-day course of emetine a month before was without action on the amoebae. A number of other substances tested were in the strengths employed without effect. Arsenicals were active against the amoebae which were able to acquire a resistance to the arsenical salts to the extent of withstanding a 1 in 1 000 concentration when a 1 in 5 000 concentration was at first toxic to them.

C M W

DESCHIENS (R) Le pouvoir pathogène des amibes dysentériques en culture, ses relations avec l'enkystement. [Pathogenicity of Dysentery Amoebae in Culture, Its Relation to Encystment.]—*Bull Soc Path Exot* 1939 Dec. 13 Vol 32 No 10 pp 923-926

It is well known that the long continued cultivation on artificial media of a strain of *E histolytica* results in a marked decrease in pathogenicity. Thus a strain which gave an infection rate of 70 per cent. for kittens, after three years culture gave a rate of less than 5 per cent. It is shown in this paper that provided the strain is caused to encyst periodically by exposure to a temperature of 4°C. there is no

only 8 (7.4 per cent.) had any symptoms also among those harbouring protozoa other than *E. histolytica* with the exception of those with *Dientamoeba fragilis* the proportion with symptoms was the same as that in the non-parasitized group. Among 44 with *D. fragilis* 12 had symptoms
H H S

HARÁN (Antonio María) Oclusión intestinal por tumor cólico amebiano [Occlusion of the Bowel by an Amoebic Granuloma].—*Arch. Uruguayos de Med. Ciruj. y Especialidades* 1940 Feb Vol. 16 No. 2, pp. 177-188.

The existence of amoebic granuloma a hypertrophic form of intestinal amoebiasis has been recorded by several observers and in character and the symptoms they produce they suggest malignant neoplasm. Nevertheless the condition is not so common that the record of this case can be considered redundant. A woman of 78 years suffered from abdominal pain, meteorism some vomiting and complete constipation for 48 hours. Her doctor had given her purgatives and administered enemas without benefit. When seen by the author her condition was better than would be supposed with such a history pulse 90 temperature 37°C vomiting had ceased, but tympanites was marked. She had a fair night vomiting did not recur and she passed flatus. As well as the distension allowed a localized swelling could be made out at the hepatic flexure of the colon. Laparotomy was performed and in the transverse colon 10 cm. from the hepatic flexure a tumour the size of a peach was seen in the wall of the colon. No enlarged mesenteric glands were discovered. The wound was closed and a caecal fistula made the diagnosis being a malignant growth. Her general fair condition and the absence of anaemia gave reason to doubt this and the idea of an amoebic granuloma came up, though no entamoebae were seen in the faecal matter. She was therefore given 12 injections of 4 per cent. emetine solution, one daily 48 cgm. At the end of this time radiological examination and colonic enemas showed that the tumour no longer existed. The faecal fistula was closed. Unfortunately the next day she had a rise of temperature pneumonia developed and death occurred eight days later. [Nothing is said of any autopsy]
H H S

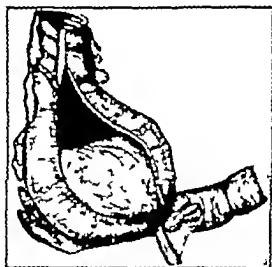
MACDONALD (R. W.) Surgical Manifestations of Amebiasis.—*Southwestern Med.* 1939 Nov Vol. 23 No. 11 pp. 381-388. With 14 figs.

The surgical manifestations of amoebiasis mentioned, with illustrative cases, in this paper are apart from hepatic abscess. Intestinal obstruction from either structure due to lesions within the bowel to the presence of an amoebic granuloma, or by pressure from without the result of peritonitis intestinal perforation either intraperitoneal causing peritonitis, or extraperitoneal, resulting in faecal fistula. lastly pulmonary abscess usually secondary to abscess of liver.

Obstruction from tumour formation is rare but an instructive case is detailed. The subject was a young Siamese male who was a pathological pluralist. His blood was positive for subtertian malaria, he was passing hookworm ova, he was a leper but the direct cause of his coming to hospital was intestinal obstruction. Operation revealed a tumour mass of gelatinous granulation tissue containing many



Amoebic granuloma high power shows vegetative amoebae in gelatinous-like tumor substance



Amoebic granuloma of caecum.
(Reproduced from *Southwestern Medicine*)

amoebae [see illustrations] The size of the tumour is not mentioned Dr Manson Bahr states that they may measure 10×12 cm. [see Manson's Tropical Diseases 11th Edition 1940 p 536] H H S

RAJAN (R. V) & RANGIAH (P N) An Unusual Case of Cutaneous Amoebic Ulceration around the Anus.—*Indian Med Ga.* 1939 Dec. Vol. 74 No 12. pp 746-748 With 4 figs.

A man of 40 years came to the General Hospital Madras complaining of anal ulceration and the passage of blood and mucus for the previous six months. He had had venereal disease and the condition was thought to be an instance of ano-rectal syndrome due to lympho-granuloma inguinale. There was a stricture of the anal orifice.

only 8 (7.4 per cent.) had any symptoms also among those harbouring protozoa other than *E. histolytica* with the exception of those with *Disentamoeba fragilis*, the proportion with symptoms was the same as that in the non-parasitized group. Among 44 with *D. fragilis* 12 had symptoms. H H S

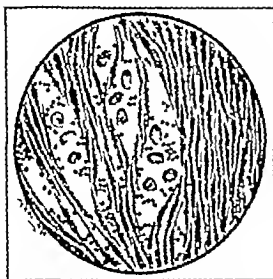
HARAS (Antonio María) Oclusión Intestinal por tumor edico ambiano. [Occlusion of the Bowel by an Amoebic Granuloma.]—Arch. Uruguayos de Med. Ciruj. y Especialidades 1940 Feb Vol 16. No. 2. pp. 177-186.

The existence of amoebic granuloma, a hypertrophic form of intestinal amoebiasis, has been recorded by several observers and in character and the symptoms they produce they suggest malignant neoplasm. Nevertheless, the condition is not so common that the record of this case can be considered redundant. A woman of 78 years suffered from abdominal pain, meteorism, some vomiting and complete constipation for 48 hours. Her doctor had given her purgatives and administered enemas without benefit. When seen by the author her condition was better than would be supposed with such a history. Pulse 90 temperature 37°C vomiting did not recur and she passed marked flatus. She had a fair night, vomiting had ceased, but tympanites was noted. As well as the distension allowed, a localized swelling could be made out at the hepatic flexure of the colon. Laparotomy was performed and in the transverse colon 10 cm. from the hepatic flexure a tumour the size of a peach was seen in the wall of the colon. No enlarged mesenteric glands were discovered. The wound was closed and a caecal fistula made, the diagnosis being a malignant growth. Her general fair condition and the absence of anaemia gave reason to doubt this and the idea of an amoebic granuloma came up though no entamoebae were seen in the faecal matter. She was therefore given 12 injections of 4 per cent. emetine solution one daily 48 cgm. At the end of this time radiological examination and colonic enemas showed that the tumour no longer existed. The faecal fistula was closed. Unfortunately the next day she had a rise of temperature. Pneumonia developed and death occurred eight days later. [Nothing is said of any autopsy.] H H S

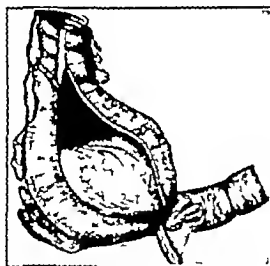
MENDELSON (R. W.) Surgical Manifestations of Amoebiasis.—Southwestern Med 1939 Vol. 23 No. 11 pp. 361-368. With 14 figs

The surgical manifestations of amoebiasis mentioned, with illustrative cases in this paper are apart from hepatic abscess, intestinal obstruction from either structure due to lesions within the bowel, to the presence of an amoebic granuloma or by pressure from without the result of peritonitis, intestinal perforation either intraperitoneal causing peritonitis or extraperitoneal, resulting in faecal fistula. Lastly pulmonary abscess usually secondary to abscess of liver.

Obstruction from tumour formation is rare but an instructive case is detailed. The subject was a young Siamese male who was a pathological pluralist. His blood was positive for subtertian malaria, he was passing hookworm ova, he was a leper but the direct cause of his coming to hospital was intestinal obstruction. Operation revealed a tumour mass of gelatinous granulation tissue containing many



Amoebic granuloma, high power shows vegetative amoebae in gelatinous-like tumor substance



Amoebic granuloma of caecum.

[Reproduced from *Southwestern Medicine*]

amoebae [see illustrations] The size of the tumour is not mentioned Dr Manson Bahr states that they may measure 10×12 cm. [see Manson's *Tropical Diseases* 11th Edition 1940 p. 536] H H S

RAJAM (R. V.) & RANGIAH (P. N.) An Unusual Case of Cutaneous Amoebic Ulceration around the Anna.—*Indian Med Gaz.* 1939 Dec Vol. 74 No 12. pp 746-748. With 4 figs

A man of 40 years came to the General Hospital Madras complaining of anal ulceration and the passage of blood and mucus for the previous six months. He had had venereal disease and the condition was thought to be an instance of ano-rectal syndrome due to lympho-granuloma inguinale. There was a stricture of the anal orifice.

Fred's reaction was, however, negative and a portion of the ulcerous tissue showed, microscopically, necrosis and numerous amoebae and a rectal smear also revealed *E. histolytica* in large numbers. Treatment by emetine hydrochloride followed by a course of E.B.I. brought about rapid healing of the local lesion and cessation of the discharge of blood and mucus [see this *Bulletin* 1939 Vol. 36 p. 295 1940 Vol. 37 p. 121] H H S

MOLINARI (G.) Lambeled cutanea. [Cutaneous Amoebiasis.—*Riforma Med* 1940 Apr. 13. Vol. 66. No. 15. pp. 485-486. With 2 figs.]

RIZZO (Juan) Sobre dos casos de bronco-amebiasis. [Two Cases of Bronchial Amoebiasis].—*Revista Med. Argentina* 1939 Nov. 1 Vol. 28 No. 44. pp. 2139-2143. With 3 figs.]

According to the author extra-intestinal amoebiasis is important in the Argentine, and pulmonary invasion may occur by way of the lymphatic or blood stream, as well as directly from the liver. There are no symptoms of pulmonary amoebiasis which can be regarded as characteristic and the condition is believed to be an ordinary bronchitis or tuberculosis until examination reveals the amoeba. Of the two cases here recorded the first was an Italian 23 years of age living in Junín, Buenos Aires Province. Ten months previously to being seen he suffered with muco-sanguineous diarrhoea which cleared up on treatment with Yatren. Some three months later he began to feel ill with cough and diarrhoea, and diffuse pain in the right side of the chest followed later by expectoration of mucoid and bloody sputum, 50-100 cc daily. Radiograms showed nothing of importance. In the stools were cystic and vegetative forms of *E. histolytica* and the latter in the sputum also. The condition cleared up after two courses of emetine each totalling 0.56 gm. with an interval of 20 days between, during which Yatren was given.

The second patient was an Argentine aged 49 years with a very similar history but for a week before coming to hospital he had fever to 41°C with shivering. In the lungs were signs of diffuse bronchitis and there was expectoration to 150 cc. daily of viscid mucus, tinged with streaks of blood. Cystic amoebae were present in the stools, and, in the sputum vegetative and precystic forms which disappeared with emetine treatment. H H S

GWEIG (E. D. W.) Observations on a Case of Amoebic Hepatitis.—*Jl. Trop. Med. & Hyg.* 1940 June 15 Vol. 43 No. 12. pp. 161-164. With 2 charts & 2 figs.]

An interesting case of a man of 25 years who though he gave no history of having suffered from dysentery began to have shivering attacks with fever and sweating a fortnight after arrival home from India. No signs of dysentery were found—no amoebae or cysts no Charcot Leyden crystals. The rise in blood sugar curve after laevulose was not marked, so the liver function was not greatly impaired though there were signs of some enlargement and a certain degree of icterus. Blood examination on admission showed leucocytes 24,000 per cmm six days later r.b.c. 3 730,000 and a fall in the colour index polymorphonuclears were 84 per cent. Blood culture sterile. Widal negative to enteric and *Br. abortus*. He was given emetine hydrochloride grain 1 daily, for ten days. The symptoms soon cleared.

temperature fell to and remained normal sweating ceased a month after admission his blood examination showed r b c 4 980 000 per cmm haemoglobin 90 per cent leucocytes normal. Professor Greig thinks that there was undoubtedly not merely a hepatitis but a small amoebic abscess which in a short time would probably have needed aspiration or surgical measures. Seeing that the disease had lasted for 8 months from the first attacks of shivering to the time of his coming under observation and treatment the patient ought to consider himself remarkably fortunate to have got off so lightly H H S

GREIG (E. D W) Case of Amoebic Abscess of the Liver without Antecedent Dysentery.—*Jl Trop Med & Hyg* 1940 May 1 Vol. 43 No 9 pp 119-122 With 2 figs. & 2 charts.

GREIG (E. D W) Amoebic Abscess of the Liver which discharged through the Lung.—*Jl Trop Med & Hyg* 1940 Aug 1 Vol. 43 No 15 pp 207-210 With 2 charts.

HUARD (P) Nouvelles recherches anatomocliniques sur les abcès du foie tonkinois. [Recent Anatomical and Clinical Research in Liver Abscess in Tonking]—*Ann de l'Ecole Supérieure de Méd et de Pharm Indochine* 1938. Vol. 2 pp 75-85 With 11 plates

ALPORT (A Cecil) & GHALIOUGUI (P) Conservative Treatment of Liver Abscesses.—*Lancet* 1939 Nov 18. pp. 1062-1065 With 5 figs.

This paper reports on five cases of liver abscess in very debilitated patients with four recoveries under the established treatment by repeated aspiration and emetine injections. In the first case 120 ounces of pus were removed at the first aspiration and a total of 270 ounces in four aspirations with recovery. The second case is noteworthy on account of a secondary *Ps. pyocyanea* infection having been found at the second aspiration this bacterial infection was treated successfully by three courses of prontosil and one of M & B 693 together with the injection of 5 cc. soluseptasine into the abscess cavity and an operation of a dangerous nature in a debilitated patient was avoided. The authors therefore suggest that this line of treatment is worthy of trial in selected cases of secondary infections of amoebic liver abscesses in place of the open operation. The third case was complicated by broncho-pneumonia on the right side with pleural effusion necessitating aspiration after the administration of M & B 693 had failed to clear up the condition. The fourth patient recovered from amoebic liver abscess under the aspiration and emetine treatment but was readmitted five months later with amoebic dysentery. The last case proved fatal, and seven abscesses were found in the liver and multiple ones in the lung so the case was hopeless. Thus this series of cases is an instructive one. L Rogers

LATTOUF (Albert G) Intestinal Amoebiasis. Its Clinical Aspects and Treatment.—*Jl Egyptian Med Assoc* 1939 Sept Vol. 22. No 9 pp. 543-552.

A congress paper based on 230 cases of amoebiasis in which the entamoeba was found to be present. The symptoms are analysed (1924)

and the treatment on the usual lines, detailed. Recovery was thought to be hastened by exhibition of calcium, vitamins B and C and liver extract the basis of treatment was a diet leaving but little residue and the correction of constipation.

H H S

VERSTICH (A.) Arsenic Treatment of Amoebic Dysentery — *For Eastern Africa Trop Med C R Dissem Concyts, Hanc*
 28 Vol 2 PP 37-48 15 rels

The arsenical preparation with which this article is mainly concerned is an arsenic compound of Bayer consisting of 18.8 per cent arsenic and 3 per cent bismuth, a light brown powder insoluble in water known as No 5547 and given by mouth in tablets of 0.25 gm. Five of these were well tolerated. The author employed it for 58 patients, 48 were chronic 40 of whom were cyst-passers and 6 suffered from European and Chinese. 12 were early cases with acute dysentery following earlier attacks of amoebic dysentery. In two cases quoted three tablets were taken in the day and by the fourth day in one the fifth in the other vegetative entamoebae could no longer be found in the stool. Another had suffered for 10 years on and off and had had all the usual forms of treatment. The stools were negative for entamoebae after 7 days but they reappeared a fortnight later and a second course was given. This resulted apparently in cure. The drug is not successful alone in severe acute amoebic dysentery but in light or moderate and in the more chronic cases it is very efficacious. The author notes that the disease is more difficult to cure in China than at home and he thinks this is because of the liability to reinfection in the former. The benefit recorded by the author warrants this drug being given more extensive trial.

H H S

JADIV (J.) Sur un cas de traitement de l'amébiase par la diodo-quinoléine — *Treatment of Amoebiasis with Diodo-quinoline* — *Ann Soc Med de l'Alg Trop* 1940 Mar 31
 Vol 20 No 1 PP 74-78

Twenty-two natives and three Europeans at the Coquilhatville hospital were treated with 3-4 tablets daily each of 25 cgm. The immediate or early results were promising but whether the benefit is lasting is less certain. In 18 cases amoebae were not found on the third day of treatment. In one patient they disappeared after one day but eleven days later there were amoebae in numbers in what the author euphemistically calls the "crachats rectals". Another after early improvement had a serious relapse a fortnight after cessation of treatment. On the other hand many when re-examined a month or two after were found free of, at all events showed no signs of passing, either cystic or vegetative forms.

H H S

MAVER (Max) Observations on Amoebiasis and its Treatment — *Indian Med Gaz* 1940 Mar Vol 75 No 5 PP 262-266

Routine examinations of stools were carried out on every patient admitted to the hospital where the author was working and during 12 consecutive months 1083 examinations were made and in 23.2 per cent there was found either the vegetative or the cystic form of *E. histolytica*. The symptoms are analysed and the patients divided

into three groups (1) With gastro-intestinal symptoms related to the infection i.e. with acute or subacute amoebic dysentery (2) With gastro-intestinal symptoms but with the cystic form only of *E. histolytica* in the stools—subchronic or chronic cases (3) Passing the cysts but with no appreciable symptoms. The drug used was enterovioform (Ciba) given in doses of two tablets (0.25 gm) thrice daily after meals. In 15 cases of acute dysentery the clinical symptoms disappeared in three days or so and no amoebae were seen after 5 days. Equally good results are reported in 11 out of 13 with subchronic infections and in 16 out of 18 in the third group. For the last the author recommends six days combined treatment with emetine and enterovioform. The patients were kept under observation for 6 weeks and in some cases even longer after treatment ceased to watch for reappearance of the parasite. H H S

ARQUIVOS DE BIOLOGIA, S. Paulo 1940 May Vol. 24 No 227 pp 101-102 —As associações de emetina e camfora no tratamento das afecções amebianas. [Combined Emetine and Camphor in the Treatment of Amoebiasis.]

The drug referred to is camphor sulphonate of emetine used first states the author by IMAZ and PASTOR who found it an excellent substitute for emetine hydrochloride without any of the inconveniences of the latter. [There is no bibliography or list of references and we cannot trace any report by Imaaz and Pastor on the use of this drug.] It is a white coloured salt stable and readily soluble in water. It has an amoebicidal and antitoxic action in dysentery and in hepatitis it is one-third less toxic than [?] has one-third the toxicity of (E um terço menos toxica que)] emetine hydrochloride. The camphor neutralizes the depressant action of emetine on the circulation. It is used in a 2 per cent aqueous solution, and the dose is 2 cc. which corresponds to 3 cgm of emetine hydrochloride. In severe cases one ampoule is given intramuscularly morning and evening for 6-12 days after which treatment is suspended for a month and the disease has usually cleared up before this. H H S

ARTAGAVEYTLA (Alejandro C.) La intoxicación emetínica en clínica. Estudio sobre dos observaciones [Two Cases of Emetine Poisoning.]—Arch. Uruguayas de Med. Ciruj. y Especialidades 1939 Oct Vol. 15 No 4 pp 372-388 With 4 figs [26 refs.]

The first patient was a woman of 40 years passing blood-stained stools and complaining of colicky pain. She had been having injections of Campolon and emetine hypodermically without any effect on the stools and, the author calculates she had received in all 1.64 gm in a month. The main toxic effects were on the nervous system, inability to hold up the head and affection of the leg muscles so that walking was difficult. Deep reflexes of the legs were diminished but there was no paraesthesia or ataxia. Babinski response normal, and sensation of heat touch and pain not affected. She was given Betaxin and injections of strychnine but without effect. Four days after coming to hospital she had difficulty in swallowing fluid returned through the nose and the voice became nasal. Pulse rate increased, dyspnoea came on and death occurred ten days after admission. A limited post mortem was carried out and changes of congestion and mononuclear cell infiltration were seen in the bulb.

The second patient was a woman of 55 years who a month before coming to hospital, had had dysenteric symptoms and amoebae were found in the stools. She was given emetine with good results. In 18 days she received 1.44 gm. She also presented widespread muscular weakness affecting arms and legs, left more than right. She could not lift her hands up to her head. tendon reflexes were weak but still present. There was no affection of deglutition. Treatment adopted was the same as in the former case but with happier result. Improvement was prompt and maintained, and the patient left hospital, apparently quite well, 23 days after entering hospital.

The author gives a list of 20 patients who presented toxic symptoms after emetine, together with the total amount of the drug they had received. This was very variable. one showed fibrillation after 0.12 gm. in six days. another recovered after 1.64 gm. H H S

MALARIA.

Prices of Abstracts in this Section

BOYD (p. 737) describes a rapid method of staining blood slides for malarial parasites by means of Stévenel's blue and eosin. The preparation of Stévenel's blue is described. It can easily be made from methylene blue and potassium permanganate. The method was found to be very successful under conditions of active service.

WEYER (p. 738) discusses the benign tertian malaria which occurs in East Friesland and points out that there is less close contact between man and *A. maculipennis* var. *stropartus* in Emden than in Holland. He considers that the cheapest means of control is the detection and treatment of infected persons.

DE MEILLON and GEAR (p. 739) report the case of a patient whose first acute attack of malaria was due to *Plasmodium coals*. This is evidence that *P. coals* is not merely an abnormal form of *P. vivax* appearing in chronic infections, as has been held. WERN and HERVEL (p. 739) report infection with *P. coals* in Mauritius.

FIELD and LE FLEMING (p. 739) have studied the morphology of *P. falciparum* in blood films.

BOYD (p. 739) has found that there are well fixed strains of *P. vivax* and *P. falciparum* showing immunological differences which may be preserved through many sexual cycles in the mosquito. The strains and the mosquitoes with which they are associated in nature may or may not be specially suited to each other.

COVELL and HARRISWAX (p. 740) show that in the malarious district of Wynad, S. India, *P. falciparum* is the commonest parasite when the parasite rate is highest but that at other times *P. vivax* is more prevalent. A list of anophelines found is given. *A. flumathilis* is the only important vector. It appears to be anthropophilic and the infection rate is high. Its breeding habits are referred to and methods of control, including house spraying with insecticides are advised. Past attempts to drain swamps have only provided increased facilities for the breeding of this dangerous vector. WHITE and ADRIKARI (p. 741) have found *A. sundicus* round the Chulka Lake on the coast of

the Bay of Bengal and this accounts for much that was obscure in the epidemiology of malaria which is intense in this region. They do not agree with the suggestion that the outlet of the lake to the sea should be closed in the dry season to drown out the shallow foreshore breeding places and give reasons for their views.

RUSSELL and MOHAN (p. 741) suggest that in attempts to infect anophelines experimentally controls of *A. stephensi* bred in an insectary from tap water larval environment should be used. This species is easy to work with and is widespread in India.

GELLER (p. 742) and BALCACHINA (p. 742) both provide lists of the anophelines found in Kazakhstan in east-central Asia.

BANG *et al* (p. 742) in Tennessee and Kentucky have found natural infection of *A. walkeri* a species which had previously been suspected on experimental grounds to be a vector.

VARGAS (p. 743) remarks on the possibility of epidemic spread of malaria in the São Paulo plateau where known vectors are to be found and where indigenous malaria does occur.

MILLET (p. 744) discusses suprarenal deficiency in relation to malaria and considers that lack of certain dietetic substances such as ascorbic acid, cysteine, chlorine and cholesterol predispose to chronic deficiency which may be latent but which may be fully manifested in response to an infective attack. In treatment therefore adequate nutrition should be provided. KRISHNAN (p. 744) discusses the vitamin C excretion and saturation of patients showing that in chronic malaria there is a state of subscorvy. He refers to the treatment of blackwater fever by cortin, ascorbic acid and glucose.

DIFSHUR (p. 745) shows that neither plasmoquine nor atebirin in the usual therapeutic doses influence the activity of non-pregnant uterine muscle or are likely to pass through the placenta. SIEGENBERG VAN HEUKELOM (p. 745) found that after treatment of subtertian malaria with atebirin or quinine the haemoglobin values tended to rise in patients whose haemoglobin values had previously been below 60 and tended to fall in those whose values had been over 60.

CHRISTOPHERS and FULTON (p. 745) have investigated the dissociation constants of plasmoquine.

RASKINE (p. 746) states that treatment of benign and subtertian malaria by a combination of acriquine with quinoline is successful: schizonts disappear in just over 4 days and gametocytes of *P. falciparum* in 6 days. CHOPRA *et al* (p. 746) report unfavourably on M3 in treatment. YAMAMOTO (p. 746) reports unfavourably on sulphanilamide in treatment.

COVELL and AFRIDI (p. 747) discuss antimalarial operations in Delhi laying stress on the spraying of dwellings with pyrethrum insecticides. The cost of these measures is given. C IV

BOYÉ (R.) Méthode de coloration extra rapide des hématozoaires du paludisme par le Romanowsky simplifié au bleu de stévenel-éosine en deux temps [Rapid Staining of Malaria Parasites with Stévenel's Blue and Eosin in Two Stages.]—*Bull. Soc. Path. Exot.* 1940 Apr 10 Vol. 33 No. 4 pp. 248-252.

Mobilization of the forces in N. Africa was followed by a sudden and intense exacerbation of malaria, and under the existing conditions laboratory facilities on the peace-time scale were not available. The author found difficulty with an old supply of Leishman's stain, and

in searching for an easy alternative method devised the following — On a partly spread thick drop of blood, dehaemoglobinized and fixed in the usual way eosin solution 1 in 1000 is flooded for 15 to 20 seconds. The slide is rinsed in a fine stream of water until no red colour is seen to come from it and it is then covered with Stévenel's blue undiluted for 40 to 45 seconds. It is then rinsed and appears to be uniformly stained a bluish purple. Examination may be made at this stage or a second staining with the eosin may be performed for a few seconds to obtain the optimum violet lilac colour. The method is rapid and certain and can be used under field conditions, it dispenses with the accurate measurements and neutralization of distilled water required by the Romanowsky methods and is the best of the rapid methods for the diagnosis of malaria. Stévenel's blue can easily be prepared from medicinal methylene blue and potassium permanganate. [The preparation of this stain is given by Stévenel as follows (*Bull Soc Path Exot* 1918 Vol 11 p 870) 1 gm. methylene blue is dissolved in 75 cc water. 1.5 gm. potassium permanganate is dissolved separately in 75 cc water when solution is complete the two are mixed in a flask, and an enormous precipitate at once forms with almost complete decolorization of the liquid. The flask is placed in a water bath for at least ½ hour during which time the precipitate redissolves and the liquid becomes a deep violet blue colour. After filtration the stain is ready for use. C II

TRANSACTIONS OF THE THIRD TRANS-Caucasian CONGRESS FOR THE CAMPAIGN AGAINST MALARIA AND OTHER TROPICAL DISEASES, BAKU 20-26 JAN 1936—559 pp 1939 Tiflis [16 roubles 50 kopecks]

This volume contains 76 papers largely of local interest. C II

WEYER (Fr) Malaria und Malariaübertragung in Ostfriesland. (Eine entomologische Studie.) (Malaria and its Transmission in East Friesland. — *Arch f Schiffs u Trop Hyg* 1940 Jan. & Feb Vol 44 Nos 1 & 2 pp. 1-29 59-73. With 2 figs. [20 refs.]

The author gives a full account of the malaria of East Friesland, the only area in Germany in which the disease is still native. The paper contains matter of considerable general interest.

The epidemic characteristics of the disease are those which have been observed elsewhere in northern Europe. Benign tertian is the only type found. The cases occur within the town of Emden and the annual number of fresh cases has ranged from 50 to 327 in the last seven years. Careful studies of the malaria in this small area have been carried out since 1910. On the entomological side it is found that *A. maculipennis* var *atroparvus* is much more prevalent than *maculipes* the only other variety which occurs. There is a full account of the seasonal resting places feeding habits, &c of the insects in general they are not common in houses.

Much of the value of Weyer's work lies in the comparison of his conclusions with those reached by Dutch workers. As there has been an exchange of visits and ideas, it seems that the differences are actual, and not due to ways of recording or observing. One interesting point is that in Holland people sleep in the attics which are attractive to *atroparvus* in Emden they sleep on the ground floor.

and are in less close contact with the mosquito. In East Friesland new infections are most commonly detected in July and August. The author says that in this there is a difference from Holland in which the peak is from mid-September to the end of October but here we believe him to be in error for it was many years ago that Dutch malaria was autumnal and it is now commonest in summer.

The view is put forward that in the area under study the cheapest means of control is the detection and treatment of the infected human beings. Has full consideration been given to the destruction of adult mosquitoes in houses? P A Buxton

DE METILLO (Botha) & GEAR (James) *Plasmodium ovale* Infection acquired during a Short Visit to a Malarious Country.—*Trans Roy Soc Trop Med & Hyg* 1940 Apr 30 Vol 33, No 6 pp 597-600 With 1 coloured plate

The case described is of interest as the patient left a non malarious area for the first time in her life to make a fortnight's trip in Southern Rhodesia. A week after her return she became ill and was found to have a *Plasmodium ovale* infection. The authors point out that a case such as this one shows that the view that *P. ovale* is merely an abnormal form of *P. vivax* appearing in chronic infections is quite unsound. The parasites from the case are shown in a coloured plate.

C M Wenyon

WEBB (J Lewis) & HERVEL (J E) A New Record of *Plasmodium ovale* (Stephens 1922).—*Parasitology* 1940 Apr Vol 32 No 1 pp 63-66

The paper records a *Plasmodium ovale* infection in a Creole woman an inmate of the Mental Hospital at Beau Bassin Mauritius. The infection was followed through all its phases all stages of development of the parasite being found. A footnote to the paper records a second case from the prison which is close to the mental hospital. C M W

FIELD (J W) & LE FLEMING (H) The Morphology of Malarial Parasites in Thick Blood Films. Part II *Plasmodium falciparum*.—*Trans Roy Soc Trop Med & Hyg* 1940 Mar 20 Vol 33 No 5 pp 507-520 With 4 figs & 6 plates (4 coloured) [11 refs]

This paper is the second of the series dealing with the characters of malarial parasites in thin and thick films. In this one *Plasmodium falciparum* is shown in a number of plates coloured and black and white the appearance in the thick film being compared with those of the thin film made at the same time. The value of the paper is in the plates themselves which with the descriptive matter should make it possible to identify the species of parasite from the appearances in the thick film alone. C M W

BOYD (Mark F) On Strains or Races of the Malaria Parasites.—*Am J Trop Med* 1940 Jan. Vol. 20 No 1 pp 69-80 [19 refs]

From observations on a number of strains of *Plasmodium vivax* and *Plasmodium falciparum* which were employed for infecting various

1. GELLER (E. R.) Sur la faune des culicidés du Kazakhstan. [Mosquito Fauna of Kazakhstan.]—*Med Parasit. & Parasitic Dis* Moscow 1939 Vol. 8. No. 5 [In Russian pp 39-48. With 9 charts. French summary p. 49]
2. BALCACHINA (E. I.) La faune de culicines de la région du Kazakhstan Méridional. [Mosquito Fauna of Southern Kazakhstan.]—*Ibid* [In Russian pp 19-37 With 5 figs. French summary p 38]

i Little has hitherto been published regarding the mosquito fauna of the vast east-central Asiatic territory Kazakhstan. The present article is based on observations carried out by the author during four years and on the material collected by antimalaria stations. The climate is continental and shows all variations from a "forest climate with a maximum rainfall in June and July to a climate characteristic of the steppes with a less uniform distribution of rainfall throughout the year and then to a desert climate with maximum rainfall in winter and spring and a hot and dry summer. Kazakhstan contains the northern limit of distribution of the majority of species of *Anopheles* that are found in Asia Minor.

The distribution of mosquitoes is dependent on climate. In the southern part the following species of *Anopheles* were found, *maculipennis satcharovi pulcherrimus superpictus algeriensis bifurcatus* and *hyrcanus*. The mountainous part of eastern Kazakhstan harbours *A. maculipennis A. hyrcanus* and *A. bifurcatus*. In the Altai mountains *A. bifurcatus* was not found. *A. maculipennis* was found throughout the territory. var *maciae* was most in evidence. A variety of *A. maculipennis atroparvus* was found in the Irtysh valley. The paper includes a list of 30 species of mosquito that were identified during the investigation.

ii. The observations of Balcachina were confined to southern Kazakhstan situated along the frontier of two deserts, one a southern type of desert the other having the characteristics of the deserts of central Asia. Near the southern desert *A. pulcherrimus* occurs and *A. maculipennis* is comparatively infrequent. Near the northern desert *A. maculipennis* is predominant, while *A. pulcherrimus* is not found. *A. hyrcanus* is abundant in both types of country. In areas near mountains *A. bifurcatus* is found, its prevalence being determined by the abundance of spring water. Thus near the central Asian type of desert the anopheline fauna is limited to two rarely three species, *maculipennis bifurcatus* and *hyrcanus*. Near the southern type of desert and along the foot of mountains five species occur *maculipennis bifurcatus pulcherrimus superpictus* and *hyrcanus*. V IV

BANG (F. B.) QUNBY (G. E.) & SIMPSON (T. W.) *Anopheles walkeri* (Theobald) a Wild-Caught Specimen harboring Malarial Plasmodia.—*Public Health Rep* 1940 Jan. 19 Vol. 55 No. 3 pp 119-120 With 2 figs on 1 plate

A. walkeri is very prevalent in the Reelfoot Lake region of Tennessee and Kentucky where it has a tendency to bite man. In the laboratory it can transmit both *P. vivax* and *P. falciparum*. For these reasons it has been under suspicion as a vector of malaria. It is not easy to collect adult *A. walkeri* in numbers. They remain hidden in swamps. The best method of collection is by means of the New Jersey light trap.

A series of dissections of light trap caught specimens was undertaken. The 231st specimen dissected had heavily infected salivary glands and 6 oöcysts were found on the stomach. These were indistinguishable from the sporozoites and oöcysts of human malaria. N IV

VARGAS (Abel) Alguns aspetos epidemiológicos da malária no planalto de São Paulo [Certain Epidemiological Aspects of Malaria in the São Paulo Plateau.]—*Ann Paulist Med e Cirurg* 1939 Dec. Vol. 38 No 6 pp 445-453

This paper contains a general discussion of endemic malaria at high altitudes and describes the conditions in the São Paulo plateau at altitudes over 700 metres above sea level. There are seasons of the year when meteorological factors are not unfavourable to the mosquito cycle of development of the malaria parasite. Malaria vectors such as *A. albivittatus* and *A. tarsimaculatus* are to be found and indigenous cases of malaria do occur. The author believes that the introduction of any considerable number of gamete carriers might well result in an epidemic manifestation of the disease. N IV

DEL VECCHIO (Gaetano) Osservazioni sulle ninfe di *A. claviger* (*bifurcatus*) Nota II. *A. claviger* var. *petragnanis* [The Pupa of *A. claviger* var. *petragnanis*].—*Riv di Parassit* Rome 1939 Dec Vol 3 No 4 pp 305-316 With 16 figs. (2 coloured) on 3 plates. English summary (4 lines)

The author following his researches on *A. claviger* (*bifurcatus*) describes the fundamental characters of the pupa of *A. claviger* var. *petragnanis* and confirms the importance of the natatory membranes of the spines of certain abdominal segments, and of the breathing trumpets in regard to differential diagnosis.

CORRADETTI (Augusto) La biologia dell'*Anopheles gambiae* e il problema malarico nell'Africa Orientale Italiana [Biology of *A. gambiae* and the Malaria Problem of Italian East Africa.]—*Riv di Biol Colon* Rome 1939 Oct. Vol. 2 No 5 pp 321-327 English summary (5 lines)

The author describes the wide distribution of *A. gambiae* in Italian East Africa, the multiplicity of its breeding places and the great difficulties that would be encountered in attempts at its control. His experience is similar to that of many observers in countries in which this species is an important vector of malaria. N IV

CORRADETTI (Augusto) Descrizione dell'*Anopheles* (*Neocellia*) *dancalicus* [Description of *A. dancalicus*].—*Riv di Parassit* Rome 1940 Mar Vol 4 No 1 pp 31-44 With 8 figs. & 1 plate

VARGAS (Luis) Notas sobre la quetotaxia de la larva del *Anopheles pseudopunctipennis* de Temixco Morelos. [The Arrangement of the Hairs of *A. pseudopunctipennis* of Temixco].—*Rev Inst de Salubridad y Enfermedades Trop* Mexico. 1939 Nov Vol. 1 No 1 pp 78-89 With 9 figs. [10 refs.] English summary (7 lines)

"2. These determinations have been made by titration of suitable concentrations of plasmoquine dihydrochloride. Determinations by the ether and other methods were found difficult, owing partly to the difficulty of determining satisfactorily the water-ether coefficient of plasmoquine and partly to the wide separation of the constants and other causes.

"3. The constants as determined must be considered as the apparent constants, and under the circumstances noted in Section IV above it was found impracticable to carry out observations necessary to determine the true constants by the method of Moore and Wumill (1912).

RASKINE (A. Ja) Les résultats du traitement du paludisme par l'acriquine combinée à la quinine No 31 [The Treatment of Malaria with Acriquine and Quinine 31].—*Med Parasit & Parasitic Dis Moscow* 1939 Vol. 8, No. 6 [In Russian pp. 75-80. With 1 chart. French summary p. 80].

A translation of the author's summary is as follows:—

1. The treatment of malaria by the combined use of acriquine and quinine 31 is effective.

2. Administration by the mouth for 5 successive days, of 0.1 gm. acriquine three times daily and 0.03 quinine twice daily cuts short the fever of subtertian malaria in 3-6 days, and of benign tertian in 3-4 days.

3. In subtertian malaria the afebrile period disappears in 4-5 days, in benign tertian in 4 days.

"4. In subtertian the gametocytes disappear by the sixth day.

5. Slight abdominal pain lasting 2 to 3 days was present in 16 cases. In all these cases the same preparations were given when treatment was repeated.

C IV

CHOPRA (R. N.) ROY (D. N.) HAYTER (R. T. M.) & SEN (B.) M 3, a New Drug in the Treatment of Malaria.—*Indian Med Gaz.* 1940 Jan. Vol. 75, No. 1, pp. 19-20.

The results of the administration of M 3 to a small series of patients have led the authors to the conclusion that the drug is without value in the treatment of malaria. It did not prevent relapses even after the administration of quinine, atabrin or plasmoquine. It did not improve the general condition of the patients to whom it was administered, nor did it cause any reduction in the size of the spleen. [See this *Bulletin* 1939 Vol. 35 p. 31.]

A IV

YAMAMOTO (Kinzaburō) Sulfanilamide in Malaria. [Abstract.] [Sulphanilamide in Malaria].—*Japanese J. Dermat & Urol* 1939 Oct. 20 Vol. 46 No. 4, pp. 78-79.

The author treated 14 cases of induced malaria with sulphanilamide. In two cure was obtained after the administration of 15 gm. and 17.7 gm. respectively. In five no antimalarial effect was seen but in seven, either the incubation period was lengthened, apparently by inhibition of the development of the plasmodia, or the paroxysms were temporarily suppressed, but returned on cessation of administration. Sulphanilamide is not, therefore, an efficient antimalarial drug. [Presumably the infection was with *P. vivax* but this is not stated.]

C IV

COVELL (G) & AFRIDI (M K.) Antimalaria Operations in Delhi.
Part II.—*Jl Malaria Inst of India* 1939 Dec Vol. 2. No 4
pp 315-340 With 3 maps & 4 figs

This is a detailed account of the various temporary or recurrent antimalaria measures adopted in the antimalaria campaign in the Delhi urban area. The organization is fully and clearly described. Insistence is rightly placed on the importance of unity of control in the carrying out of such measures on a large scale. This is effected by the provision of an independent checking staff working under the direction of an officer of the Malaria Institute of India. The efficiency of measures is thereby gauged and waste eliminated. The larvicide most frequently used is a mixture of diesel oil and cresol. The spraying of dwellings with pyrethrum insecticides is a measure to which much importance is attached. The annual cost of recurring antimalaria measures approximates two annas per head of the population protected or two rupees per acre of ground to which measures are applied

N IV

WYCKEL (Ch W F) Technique de l'impaludation thérapeutique
[Technique of Therapeutic Malaria].—*Rev du Paludisme et de Méd Trop* Paris. 1940 Apr 15 Vol. 2. No. 10 pp 97-109 With
8 charts [14 refs]

EPIDEMIC DROPSY

PRÉCIS OF ABSTRACTS IN THIS SECTION

In the leading article of the *Indian Medical Gazette* (p. 748) it is shown that although poisoning with argemone oil produces symptoms indistinguishable from those of epidemic dropsy, the disease does not necessarily coincide with the common use of contaminated mustard oil. The suggestion is made that the condition may be due to the consumption of argemone oil by people whose diet possibly through vitamin deficiency has predisposed to the condition and that the process is one of conditioned toxicity. BHATTACHERJEE (p 749) brings further evidence to incriminate the seed oil of *Argemone mexicana* in the aetiology of epidemic dropsy. The diet of those subject to the disease is deficient in vitamin D.

PASRICHA *et al* (p 749) show that the toxicity of mustard oil contaminated with argemone oil is completely eliminated by heating to 240°C. for 15 minutes but is not affected by heating to 150°C. They describe the pathological appearances of the various organs of animals receiving argemone oil—fatty degeneration and necrotic foci in the liver and acute haemorrhagic glomerulo-tubular nephritis. TRIBEDI and DE (p 749) also describe the pathological appearances of epidemic dropsy. The basic characteristic is the dilated and engorged capillary angiomatous condition which may be due to liberation of histamine. Note is made of the verrucoid eruptions on the skin [these are also referred to by PASRICHA *et al* below]. Microscopically no signs of inflammation are seen.

CHOPRA *et al* (p. 750) show that the sera of patients with epidemic dropsy have relative viscosity and surface tension below the normal. In chronic cases the cholesterol content of whole blood is increased and this may be a compensatory mechanism to increase the colloid osmotic pressure which is lowered by depletion of albumin.

PARRICHA *et al* (p. 750) report an outbreak in boys in an institution where the mustard oil used contained about 1 per cent. of argemone oil. They discuss the red cell sedimentation rate in this condition. CHOPRA *et al* (p. 751) also describe an outbreak in which argemone oil was incriminated. C IV

SARKAR (SARAN LALL) Katakhar Oil Poisoning.—*Indian Med Gaz.* 1939 Dec Vol 74 No 12 pp 752-753

This short article which appeared 14 years ago is reprinted to show that argemone oil (katakhar oil is the local name for the oil of *Argemone mexicana*) was more than suspected long before scientific investigation was taken up to prove the aetiology of epidemic dropsy. The article was abstracted at the time in this *Bulletin* (1927 Vol. 27 p. 238.)

H H S

INDIAN MEDICAL GAZETTE 1940 Dec. Vol 74 No. 12 pp 751-752.
—The Aetiology of Epidemic Dropsy

This leading article presents an excellent reasoned discussion on a vexed subject. The three theories of the causation of epidemic dropsy first that there is an infecting organism or virus second, that the condition is an intoxication due to diseased rice mustard oil, or an adulterant third, that it is an avitaminosis, are all considered and discussed.

From a public health point of view the case would seem to be clear. Argemone oil (katakhar oil) produces symptoms indistinguishable from those of epidemic dropsy and investigations of recent outbreaks have shown that this adulterant of mustard oil was always present. It can be detected by a simple test of a colour change on addition of nitric acid to the mustard oil, and consequently if this is the sole cause prohibition or better prevention of the sale of argemone-contaminated mustard oil should eliminate epidemic dropsy.

The matter however is not quite so simple and clear-cut. The actual nature of the poison is not known, nor its mode of action. Argemone is a self-sown weed, a common contaminant of the mustard plant, and it is strange that epidemic dropsy is not more widespread. It is for instance comparatively rare among the poorer Anglo-Indians who use mustard oil very largely for cooking—perhaps the heating reduces its toxicity [see PARRICHA *et al* below]. Again rice, even sound rice is generally thought to be bad for those suffering from epidemic dropsy and it is further thought that those living on a diet in which rice enters largely are more susceptible to the disease and that rice therefore does play some part, even if a subsidiary part only. The author makes a potent suggestion that epidemic dropsy may be another example of "conditioned toxicity" — the toxic effect of a toxic substance being conditioned by the nature of the diet or the state of vitamin saturation of the subject — other examples being selenium poisoning and high protein diet and lead poisoning and vitamin C. [The article is a very stimulating one.]

H H S

BHATTACHERJEE (Niranjan) An Investigation into the Etiological Possibilities of Epidemic Dropsy—*Calcutta Med Jl* 1939 Nov Vol. 36 No 5 pp 350-363 [27 refs.]

This article adduces further evidence incriminating the seed oil of *Argemone mexicana* a common adulterant of mustard oil. The whole is a useful summary giving a brief historical sketch an account of the symptomatology and post mortem findings the author gives figures showing the fall in serum calcium with the appearance of dropsy and analyses the diet of those subject to the disease demonstrating the deficiency of vitamin D. He next describes the results of a test with a suspected mustard oil carried out on himself and six other volunteers the actions and properties of *Argemone mexicana* and of an alkaloid isolated from the suspicious oil sample showing that it was identical with one obtained from the Mexican poppy H H S

PASRICHA (C L.) LAL (S.) & BANERJEE (K.) The Effects of the Oral Administration of Argemone Oil to Laboratory Animals—*Indian Jl Med Res* 1940 Apr Vol 27 No 4 pp 947-951

Oral administration of the expressed oil from seeds of *Argemone mexicana* has been shown by CHOPRA and his co-workers to give rise to symptoms of epidemic dropsy [see this *Bulletin* 1939 Vol. 36 p 909]. This oil is more toxic to laboratory animals than is mustard oil but heating mustard oil adulterated with argemone oil to 240°C

fuming temperature, for 15 minutes eliminates almost completely its toxicity. Gumbapigs and white mice were used for these experiments. Animals received the standard stock laboratory diet but those receiving argemone oil might lose 50 per cent or even more in body weight. Heating to 100 or even 150°C was found not to affect the toxicity. The toxic action was particularly noticeable in the liver and kidneys. The former showed portal congestion and some degree of thrombotic fatty degeneration of the cells throughout the lobules with small necrotic foci near the periphery. The kidneys showed acute haemorrhagic glomerulo-tubular nephritis and degeneration of the epithelium in the convoluted tubules and descending limbs of the loops of Henle. These changes resemble those due to diethylene dioxide (dioxane) but are more extensive. In addition to the above changes in liver and kidneys there is oedema of the gastric and intestinal mucosa the vessels of the villi are congested and the epithelial cells are swollen and desquamated.

If the results recorded above in animals—the heating of the oil to 240°C. deprives it of toxicity—are found to be true also of man we have a ready means of controlling outbreaks of epidemic dropsy.

H H S

TRIBEDI (B P.) & DE (M N.) Observations on the Pathology of Epidemic Dropsy—*Calcutta Med Jl* 1940 Apr Vol 37 No 4 pp 209-220 With 17 figs. (3 coloured) on 10 plates. [10 refs.]

As stated in the title this article is concerned with the pathology the morbid anatomy and histology of epidemic dropsy as shown in two cases the findings of which are detailed. The basic characteristic is the dilated and engorged capillary angiomatous condition, although this may constitute only part of the picture. There has

been much speculation whether this is the result of physiological demand caused by the poison of epidemic dropsy or not. One suggestion is that a large amount of histamine-like substance is liberated and causes capillary dilatation. Also the presence of *Argemone mexicana* as an adulterant of mustard oil may lead to the same effect by direct irritation or indirectly by liberation of histamine. The verrucoid eruptions on the skin and mucosae of some patients place the vascular condition almost in a class by itself (though they are seen in some cases of *verruca peruviana* and in onychia). Microscopically no signs of any inflammatory reaction are seen as if the poison whatever it is, were a mild one perhaps acting for a considerable time and having a special predilection for the blood vessels. The changes are well shown in the coloured plates and a series of photomicrographs. H H S

CHOPRA (R. N.) MAZUMDAR (D. C.) & ROY (A. C.) Some Observations on the Lipoid Content of the Blood in Epidemic Dropsy—*Indian Jl Med Res* 1940. Apr Vol. 27 No 4 pp 837-845. [14 refs.]

The sera of epidemic dropsy patients have been shown to have relative viscosity and surface tension below those of normal subjects and from investigations carried out it would appear that nearly all the factors controlling the fluid exchange between the blood and the tissues are disturbed. The three main factors of this are (1) The hydrostatic power of the blood which depends on its viscosity (2) The osmotic pressure of the serum colloids which is lowered in epidemic dropsy (3) Increase in permeability of the capillaries.

In some conditions with dropsy and with anaemia the blood cholesterol and lecithin undergo significant changes, and the present authors have estimated these in the whole blood, the plasma and the cells in 16 acute cases of epidemic dropsy, in 15 chronic and recurrent cases in 8 with marked erythema legs and 2 with sarcoids. The resultant findings in each case are presented in protocols but they may be summed up as follows. In acute cases the cholesterol content is within the normal range but the average is somewhat higher 150.8 mgm per cent the normal average being 118 mgm. In chronic and recurrent cases it is increased ranging between 184 and 250 with an average of 218.8 in the sarcoid cases a little higher 219.3 [but there were only two sarcoid cases investigated]. The lecithin figures are normal in both acute and chronic cases a little subnormal in those with sarcoids but the individual figures show a much wider range than is found in normal subjects in acute cases the limits were 7.0 and 12.0 in chronic cases 7.8 and 12.5.

The authors suggest that the raised cholesterol values may be a compensatory mechanism to increase the colloid-osmotic pressure of the blood which is markedly lowered in epidemic dropsy due to a depletion of the albumin fraction. H H S

PARRICHA (C. L.) LAL (S.) VALIA (H. S.) & BISWAS (P. K.). An Outbreak of Epidemic Dropsy in a Closed Community—*Indian Jl Med Res* 1939 Dec Vol. 74 No 12 pp 733-735

The institution at which this outbreak of epidemic dropsy was studied had been free from the disease between 1933 and 1939. The diet was varied and well-balanced. In January 1939 two boys

developed sarcoids accompanied by mild diarrhoea and one showed slight oedema. In May eleven more reported sick and were found to have oedema of the legs by the following month 37 had diarrhoea fever and later oedema. Seventeen showed sarcoids from pin point to $1\frac{1}{3}$ inch in diameter the average being 2.4 mm. Examinations were carried out to exclude verruca. Other investigations were made including corpuscle-sedimentation rate. This last is supposed to be increased in epidemic dropsy but its limits are wide and though the authors conclude that it is of value this is not very clear. Of 16 boys suffering from epidemic dropsy the rate varied between 20 and 93 mm in an hour and of 9 healthy boys between 19 and 122 mm. As the latter exhibited no clinical evidence of epidemic dropsy they are [somewhat arbitrarily it would seem] classed as being in a 'pre epidemic dropsy state'. In another case a man with cardiac dropsy the sedimentation rate was normal indicating the value of the test in differential diagnosis. Investigation showed that the mustard oil used contained about 1 per cent argemone oil. H H S

CHOPRA (R. N.) PASRICHA (C. L.) & BANERJEE (K.) An Outbreak of Epidemic Dropsy—*Indian Med Gaz.* 1940 May Vol. 75 No 5 pp 261-262.

This affords further corroborative evidence incriminating *Argemone mexicana*. In a certain institution the inmates could be divided into two groups which had the same diet, with one exception the mustard oil which was obtained from different sources. The groups used separate kitchens. In the one group were 27 adult women fifteen presented the symptoms of epidemic dropsy and one developed a large pedunculated sarcoid. The mustard oil used by this group was found to contain 3-5 per cent argemone oil. The other group of about 100 persons escaped entirely the mustard oil used by these was found to be free from argemone oil. As soon as the outbreak was recognized the oil used was stopped and with this there were no more cases. H H S

BERIBERI AND OTHER DEFICIENCY DISEASES.

PRÉCIS OF ABSTRACTS IN THIS SECTION

ROSEDALE (p 752) gives details of the vitamin B₁ protein and mineral content of husked rice in comparison with polished rice showing that the use of the former would go far to meet the dietary requirements of the people of Malaya. Supplementary foods necessary with a diet of polished rice are not easily available husked rice is considerably cheaper and its digestibility is not noticeably different. The people should be educated in the use of unpolished rice.

BARLOVATZ (p 753) describes an outbreak of beriberi in the Belgian Congo in which most of the patients showed oedema tachycardia and

been much speculation whether this is the result of physiological demand caused by the poison of epidemic dropsy or not. One suggestion is that a large amount of histamine-like substance is liberated and causes capillary dilatation. Also the presence of *Argemone mexicana* as an adulterant of mustard oil may lead to the same effect by direct irritation or indirectly by liberation of histamine. The verrucoid eruptions on the skin and mucosae of some patients place the vascular condition almost in a class by itself [though they are seen in some cases of verruga peruviana and in onychiai]. Microscopically, no signs of any inflammatory reaction are seen, as if the poison whatever it is, were a mild one perhaps acting for a considerable time and having a special predilection for the blood vessels. The changes are well shown in the coloured plates and a series of photomicrographs.

CHOPRA (R N) MAZUMDAR (D C) & ROY (A C) Some Observations on the Lipoid Content of the Blood in Epidemic Dropsy—*Indian J Med Res* 1940 Apr Vol 27 No 4 pp 937-945 [14 refs.] H H S

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In some conditions with dropsy and with anaemia the blood cholesterol and lecithin undergo significant changes and the present authors have estimated these in the whole blood the plasma and the cells in 16 acute cases of epidemic dropsy in 15 chronic and recurrent cases in 6 with marked erythema legs and 2 with sarcoeds. The resultant findings in each case are presented in protocols but they may be summed up as follows. In acute cases the cholesterol content is within the normal range but the average is somewhat higher (10.9 mgm per cent the normal average being 11.6 mgm. In chronic and recurrent cases it is increased ranging between 18.4 and 20.3 [but there were only two sarcoed cases investigated]. The figures are normal in both sarcoed and chronic cases a little higher than in those with erythema but the individual figures show a wider range than is found in normal subjects. In acute cases the figures were 7.0 and 12.0 in chronic cases 7.0 and 12.5.

The authors suggest that the raised cholesterol values may be a sensory mechanism to increase the colloid-osmotic pressure of the blood which is markedly lowered in epidemic dropsy due to a fall in the albumin fraction.

CHA (C L) LAL (S) MALIK (K S) & BISWAS (P K) An Outbreak of Epidemic Dropsy in a Closed Community—*Indian J Med Res* 1939 Dec Vol 24 No 12 pp 733-735 H H S

The institution at which this outbreak of epidemic dropsy was had been free from the disease between 1833 and 1839. The outbreak was varied and well-balanced. In January 1839 two boys

developed sarcoids accompanied by mild diarrhoea and one showed slight oedema. In May eleven more reported sick and were found to have oedema of the legs by the following month 37 had diarrhoea fever and later oedema. Seventeen showed sarcoids from pin point to 1/3 inch in diameter the average being 2.4 mm. Examinations were carried out to exclude verruca. Other investigations were made including corpuscle-sedimentation rate. This last is supposed to be increased in epidemic dropsy but its limits are wide and though the authors conclude that it is of value this is not very clear. Of 16 boys suffering from epidemic dropsy the rate varied between 20 and 83 mm in an hour and of 9 healthy boys between 19 and 122 mm. As the latter exhibited no clinical evidence of epidemic dropsy they are [somewhat arbitrarily it would seem] classed as being in a 'pre-epidemic dropsy state'. In another case a man with cardiac dropsy the sedimentation rate was normal indicating the value of the test in differential diagnosis. Investigation showed that the mustard oil used contained about 1 per cent. argemone oil. H H S

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BERIBERI AND OTHER DEFICIENCY DISEASES

PRÉCIS OF ABSTRACTS IN THIS SECTION

ROSEDALE (p 752) gives details of the vitamin B₁ protein and mineral content of husked rice in comparison with polished rice showing that the use of the former would go far to meet the dietary requirements of the people of Malaya. Supplementary foods necessary with a diet of polished rice are not easily available husked rice is considerably cheaper and its digestibility is not noticeably different. The people should be educated in the use of unpolished rice.

BARLOVATZ (p 753) describes an outbreak of beriberi in the Belgian Congo in which most of the patients showed oedema, tachycar

evidence of nerve involvement. It appears that increased consumption of manioc consequent upon failure of the normal supplies of bananas was a feature of the diet in the patients concerned. SCHRETZENMAYER (p. 753) describes the X-ray appearances of the heart in wet beriberi treatment with betaxin causes rapid reduction in the size of the heart especially in the lateral measurement. The electrocardiographic changes are also described.

CHAMPY and COUJARD (p. 753) quote experiments with pigeons which show that in avitaminous B_1 cold accelerates the onset of neuritis and plays a part in determining its localization. PORTO and de SOLDER (p. 754) have studied the histological changes in the hearts of dogs maintained on diets deficient in vitamin B_1 . KUCKENBERG-GODARD (p. 754) regards protein deficiency as at least a part cause of certain conditions of which oedema is a feature. COCKCROFT and PAULINO (p. 755) describe a method for estimating the vitamin C content of blood and have examined the blood of a number of normal Filipinos. A level of ascorbic acid in the blood plasma between 0.8 and 1.0 mgm per cent. is satisfactory but figures below 0.7 represent a pre-scorbutic condition.

ROSEDALE (John Lewis) *The Nutritive Value of Rice.*—[7] *Malaya Branch Brit Med Assoc* 1939 Dec Vol. 3, No 3, pp 213-227. With 8 figs. [Summary appears also in *Bulletin of Hygiene*]

Husked rice (from which the outer hard fibrous coat has been removed but where no polishing has been carried out) and polished rice were compared for their nutritive value. In Australia, husked rice is only two-thirds of the price of polished rice. It contains only 2.5 per cent more fibre than the polished rice. It contains only 15 per cent more protein. Its vitamin B_1 content is 1/10th that of yeast, while polished rice contains practically no B_1 . With husked rice 21-4 oz equivalent to 2,200 calories provide 53 gm protein, whereas the same amount of polished rice provides 38 gm. As 58 gm protein is considered about the average requirement of Singapore subjects, a diet of husked rice would go far towards supplying the protein requirement. The mineral content of husked rice is 1.03 per cent, as compared with 0.8 per cent in polished rice. Na and Cl are double in husked rice also the iodine content is higher than in polished rice. The equivalent of 2,200 calories of husked rice provides 0.56 gm. CaO of polished rice only 0.08 gm. CaO. The same quantity of husked rice gives 19 mgm iron of polished rice 6 mgm. The Cu content of husked rice is double that of polished rice. More than three-quarters of the fat content of rice disappears on polishing. A number of foods representative of those eaten in Singapore were tested as supplements to a polished rice diet but in no case could the difference between the two types of rice be bridged by any supplementary foods ordinarily available. In every case husked rice was found to be more economical than the same amount of polished rice as a greater amount of supplementary food was always required with the polished rice diet to produce a given increase of body weight in young rats. The poor man who can afford only meagre supplements to his rice diet will receive far greater benefit from his small monetary outlay if his rice is not polished. More water and 5 minutes longer cooking are required when husked rice is used. It remains for administrative authorities to educate the people as to the value of unpolished rice.

Douglas C Harrison.

BARLOVATZ (A.) Une épidémie de béri-béri dans le Congo Oriental [An Outbreak of Beriberi in the Eastern Congo]—*Ann Soc Belge de Méd Trop* 1940 Mar 31 Vol. 20 No 1 pp 1-12

This outbreak affected men working on a mine who were on a restricted diet of manioc flour their customary bananas or plantains having failed them. Two diets were analysed one containing manioc flour bananas rice meat groundnuts and oil was found to supply 330-577 I U of vitamin B_1 daily the second containing more of the manioc but less than one third of the bananas supplied only 198-485 units. The first is as good as any native diet in Africa. With a caloric value of 3 000 300 I U of vitamin B_1 is sufficient especially if the carbohydrates do not exceed 500 gm. On the second diet the amount might be considerably below this.

In this outbreak 50 were attacked and four died. The prevalence of the chief symptoms was oedema of legs 44 of the face 19 generalized 8 cardiac dilatation 20 tachycardia 47 calf muscles painful on pressure 32 difficulty in walking 16 difficulty in rising from stooping position 10 inability to rise 4. The average stay in hospital was 67 days. On re-examination of the patients a year later a few still showed some disturbance of cardiac rhythm but eventually recovery was complete. H H S

SCHRETZENMAYR (A.) Röntgenologische und elektrokardiographische Studien am Beri-Beri-Herser [X-Ray and Electro-Cardiographic Study of the Heart in Beriberi]—*Arch f Schiffs u Trop-Hyg* 1939 Oct. Vol. 43 No 10 pp 427-440 With 11 figs.

X ray photographs of the thorax demonstrate clearly the larger changes in the heart of wet beriberi patients and a series showing the conditions before and after treatment with betaxin confirm the clinical improvement by the rapid reduction in the size of the heart especially the lateral measurement. Electro-cardiographic tracings show the remarkable changes in the picture as the cardiac state improves. By the X ray three stages can be distinguished of these the second the form of enlargement is regarded by the author as characteristic of beriberi and the rapid diminution in the transverse diameter when vitamin B_1 is given is of great value in differential diagnosis. Of the cardiograph changes the fall of the T wave when vitamin B_1 is given is seen only in severe cases of this avitaminosis the shortening of the P-Q interval is not specific being merely the result of rise in frequency. Disturbances of conductivity and stimulation have no essential part in the picture of deficiency of vitamin B_1 . H H S

CHAMPY (Christian) & COUJARD (Roger) Localisation et accélération par le froid des névrites de l'avitaminose B_1 [Localization and Acceleration of Neuritis due to Avitaminosis B_1 as the Effect of Cold.]—*C R Acad Sci* 1940 Jan 22. Vol. 210 No 4 pp 150-152.

It is not generally known that an extraneous cause may localize the lesions of vitamin deficiency nor on the other hand does frost bite of the feet lead to neuritis. The authors kept pigeons and fowls on an avitamin diet such that polyneuritis occurred after 22-30 days. About 10-12 days before these symptoms were due some of these birds were placed in a cage so that their feet were in cold water (0 to -4°

[October 1940]

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in the case of some, -2° to -8° for others) 1-2 cm. in depth controls being at laboratory temperature 12° - 15°C . Other controls were given ordinary food but kept in the cold cage. After 3 days the deficiency birds in the cold had oedema of the feet but none of the others showed this symptom. In another 24-48 hours there was currant jelly oedema and desquamation. In the sciatic nerve the neuritis was clearly more marked in the same birds than in those at room temperature. In both the nerve fibres showed degeneration with fatty change in the myelin, but these were much more numerous in the chilled animals. In fact, many of the fibres in those kept at 12° - 15°C showed little change whereas nearly all the fibres were swollen and showed degenerative changes in the cases of the chilled. The authors conclude that in avitaminosis B_1 cold accelerates the onset of neuritis and plays a part in determining its localization.

H H S

PORTO (J.) & DE SOLDATI (L.) *Altérations microscopiques du coeur du chien en avitaminose B_1* [Histological Changes in Dog's Heart in B_1 Avitaminosis.]—C R Soc Biol 1940 Vol. 133 No 4 pp 726-728. With 2 figs.

Four dogs were given a diet deficient in vitamin B_1 . Three died, the fourth was killed. All had exhibited typical general and cardiac symptoms of avitaminosis. Sections showed an interstitial oedema involving the intermuscular and interfibrillar fibres, vacuolization around the nuclei of the muscle fibres and more of the conducting paths. Some fibres presented homogenization or a hyaline change and patches of leucocytic infiltration. The longitudinal striation was more marked than normal, the transverse less. The right auricle showed the greatest degree of involvement, the right ventricle next and the auricular appendices less. These changes, state the authors, are characteristic of B_1 avitaminosis, but not specific. H H S

KUCZYNSKI-GODARD (Maxime H.) *El hambre de proteínas la anquilostomiasis, la coca y la opilación* [Protein Deficiency Ankylostomiasis, Coca and Opilación.]—Reprinted from *Reforma Méd* Lima 1940 7 pp. English summary.

This is a general discussion on conditions associated with oedema, but in general terms and not adducing any real evidence. The author quotes the statement that 'deproteinization symptoms do not arise without hookworms, but ankylostomiasis never produces this symptom (oedema) in the absence of chronic alimentary deficiency'. [The term opilación or the Portuguese oppilação is not easily translated. It has been used for constipation, for amenorrhoea, for the swelling of Chagas's disease and for hookworm. To cover all these it seems to mean 'oedema.'] It differs from beriberi in the absence of nervous symptoms. Those who indulge too freely in coca develop insomnia, jaundice, loss of appetite and some oedema. This too may be called opilación. On these vague grounds the author is brought to believe that bouffure d'Annam (Annam swelling) the Kwango syndrome of the Belgian Congo opilación of the Amazon regions and oedema disease of the tropical rainy forest, together with hookworm oedema and that of coca excess are all due to protein deficiency at least as part cause. [See also this *Bulletin* 1939 Vol. 38 pp 913-914.]

H H S

CONCEPCION (Isabelo) & PAULINO (Peregrino) with the technical assistance of Solita F. CASARA & Maria Luisa GARGARITANO. *Studies on Vitamin C. V. The Vitamin C Content of Normal Filipino Blood.*—*Jl Philippine Islands Med Assoc* 1939 June Vol. 19 No 6 pp 337-344 [16 refs] [Summary appears also in *Bulletin of Hygiene*]

Before deficiency of Vitamin C is evidenced by scurvy there must be a prescorbutic stage which it is important to estimate. There are three methods in common use to this end (1) The capillary resistance test (2) The urine saturation test (3) Determination of the vitamin C content of the blood. Of these the last is the most promising and accurate.

As a preliminary to any study of changes it is essential to establish the normal standard and the authors have in this article recorded the results of examining 93 Filipinos 44 males ranging in age between 14 and 52 years average 26.6 and 54 females from 13 to 46 average 23.6 years. The method employed is the following

The blood was taken before breakfast and immediately after withdrawal was transferred to a test tube containing 10 mg. of KCN and 15 mg. of potassium oxalate. The plasma was separated by centrifuging. To 2 cc. of plasma were added 2 cc. of distilled water and 8 cc. of 10 per cent. metaphosphoric acid (made up fresh daily). The mixture was stirred for thirty seconds and allowed to stand for three minutes. In order to separate the protein precipitate from the protein free fluid the mixture was centrifuged. Two cubic centimeters of the supernatant fluid were used for the determination of ascorbic acid and placed in a 50 cc. beaker for titration with 2.6 dichlorophenol indophenol. Titrations to a pink end point were carried out using ordinary light. The strength of the dye used was 0.5 gm. dissolved in 100 cc. of warm water heated to 85°C. shaken for fifteen minutes and filtered when necessary.

* The ascorbic acid content of the red cells was assayed as follows. The red cells were washed four times with 0.9 per cent sodium chloride solution containing 100 mg. per cent. of KCN and separated each time by centrifuging. After four washings, the volume was doubled by adding distilled water containing 100 mg. per cent. of KCN. To 2 cc. of this solution of hemolyzed cells, 2 cc. of distilled water and 8 cc. of 10 per cent. metaphosphoric acid were added. The protein free liquid was obtained and assayed in the same manner as that of the plasma.

The results are summarized in a series of tables. One shows the distribution of vitamin C values in plasma and red corpuscles and is usually between 0.5 and 1.0 mgm. per cent. with extremes of 0.25 and 2.75. Another shows the distribution according to sex: the mean value in the males was 0.94 ± 0.043 and for females 1.13 ± 0.03 . The vitamin C content of blood is said to vary with the amount in the food with sex, pregnancy, lactation and exercise. The authors found that pregnancy and lactation markedly lessened the content, and confirmed GREENBERG that the vitamin C content of the diet has marked influence on the blood ascorbic acid. They did not find any correlation between the ascorbic acid content of the blood and the weight of the subject. They conclude that a level of ascorbic acid in the blood plasma between 7.8 and 1.0 mgm. should be considered sufficient and any figure below 0.7 should be considered insufficient or a pre-scorbutic condition.

H H S

REVIEWS AND NOTICES

KUDO (Richard Rokusabro) [D.Sc., Associate Professor of Zoology, Univ. of Illinois] *Handbook of Protozoology* Enlarged and completely rewritten edition.—pp xi+689 With 291 illustrations 1939 London Baillière, Tindall & Cox, 7 & 8 Henrietta Street W.C.2. [38s.]

A review of the first edition of this book published in 1931 was given in this *Bulletin* 1931 Vol. 28, p. 693 and it was pointed out that this was a text-book of protozoology intended for students of zoology and that the medical aspects of the subject received only the attention which the protozoa involved justified from the purely zoological standpoint. The new edition, though very largely rewritten, has the same character as the first, so that it will have little use for medical men who wish to obtain information about the protozoa from the pathological point of view but it will undoubtedly make an appeal to those who wish to go beyond the purely utilitarian limits and who wish to have a general conception of the group of protozoa as a whole. It is estimated that there are between 15 000 and 20 000 species of protozoa, and the portion of the book devoted to those of interest to medical men does not go beyond five and a half pages. There is an extensive systematic section of 470 pages and the whole is profusely illustrated with 291 figures each of which contains up to as many as 20 separate drawings. The book will be an excellent reference book for students of protozoology but for detailed information about any of the very numerous forms mentioned recourse will have to be had to more specialised books or monographs. C. M. Wrayson

STEVENS (R.) [D.S.O. M.C. M.B. B.Ch.] *A Handbook of Malaria Control*. With a Foreword by Sir Malcolm Watson, LL.D. M.D., C.M. D.P.H. FR.F.P.S.—73 pp. With 13 figs. & 6 plates. London: Ross Institute of Tropical Hygiene, London School of Hygiene & Tropical Medicine, Keppel Street, Gower Street W.C.1

This handbook is intended for the use of planters, engineers and other laymen who may undertake anti-malarial work, and contains in brief but attractive form a great deal of the information necessary to the understanding of the problems involved and to the practical application of the methods used. There is a chapter in which are given figures largely drawn from the work of Sir Malcolm Watson, showing the reduction in malaria and other diseases which has taken place in certain localities after the institution of control measures. The nature of malaria and the principles of mosquito transmission are briefly explained, but the main part of the book is devoted to controls, especially larval control. The methods described are of course, not new but are explained shortly and the reasoning on which they are based is clearly set out. Practical details of procedure in draining are given and should serve to prevent mistakes and wasted effort. The value and technique of oiling are stressed, and mention is made of the use of Paris green.

In appendices are given instructions on the collection and dissection of adult mosquitoes, the collection of larvae the precipitin test and other matters, and there is a section of 17 pages in which are set down

the breeding habits and malaria transmitting propensities of some 46 species of *Anopheles* throughout the world.

Modern work on malaria control has not been neglected in the preparation of the book and although there is no pretence at completeness in dealing with so large a field it will undoubtedly prove useful to those for whom it is intended provided that they work under the supervision of experts in anti-malarial measures who are qualified to decide as to the best procedures to be adopted in the local conditions which exist in the areas concerned. There are some good and helpful illustrations.

C IV

HENRY LESTER INSTITUTE OF MEDICAL RESEARCH (SHANGHAI CHINA)
Annual Report 1939 [EARLE (H. G.) Director]—58 pp. With 3 plates.

In this report reference is made to the work of H. C. HOU on beriberi. He has found that in most acute cases treatment by one injection of 5 mgm. thiamin [route not stated] followed by the administration of 3 mgm. a day by mouth is sufficient. In chronic cases administration by the oral route is satisfactory and preparations such as marmite and yeast powders are less effective than pure B₁ or thiamin. Work on the inorganic elements in nutrition and on the assay of vitamin A in Chinese foods has been carried out by other members of the staff. In the refugee camps use was made of large quantities of orange peel infusion for the prevention of scurvy and of soybean milk supplemented with lime salts and syrup while soybean cakes of high nutritional value were prepared from residue. Infants were found to thrive well on a milk made from soybean-egg yolk powder.

Short sections on pharmacology and toxicology are included and the results of blood group investigations are given. Work on parasitic trematodes has been carried out and the susceptibility of certain mosquitoes to experimental infection with *Mf. malayi* has been tested. Complete development was found to take place in *Culex pipiens* var. *pallens* and *C. vorax* and the susceptibility of *A. hyrcanius* var. *sinensis* and *C. tritaeniorhynchus* was confirmed. *C. pallido-thorax* is a suitable host for *Mf. bancrofti*.

A list of papers published by members of the staff is appended many of these have already been abstracted in this *Bulletin*.

C IV

LEAGUE OF NATIONS. HEALTH ORGANISATION. Graphic Illustrations selected from the Publications of the Epidemiological Intelligence Service of the League of Nations for teaching Epidemiology and Vital Statistics. CH 1438—46 mimeographed pp. With 55 loose pages of maps and graphs. [In French and English.]

This is a collection of loose maps and graphs showing the world wide geographical distribution of a number of diseases—diseases of childhood cholera diphtheria, dysentery encephalitis lethargica influenza plague acute poliomyelitis, scarlet fever trypanosomiasis typhus undulant fever and yellow fever. Maps showing the distribution of

vectors are included. The first group of maps and graphs is concerned with births infant mortality and general mortality rates and brief notes in French and English are provided for all. The series is intended as an aid in the teaching of epidemiology and the maps and graphs have been prepared with a view to use with the epidiascope. From time to time it is hoped that they will be brought up to date by the issue of fresh sheets.

The series is excellent and should be of great service to teachers, especially in tropical medicine.

C IV

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No 11

SUMMARY OF RECENT ABSTRACTS *

IX. LEPROSY

Epidemiology

In the epidemiology of leprosy stress is once more laid by several authors on the importance of contact and especially of family contact. Climatic conditions also appear to be significant in determining incidence but it may be reasonable to ask whether or not the importance of climate is that it largely controls soil fertility and therefore population density. In other words it may lead to increased contact. Racial susceptibility also appears to be a considerable factor.

RADNA (p 1022) considers that family contact constitutes the greatest danger in leprosy. Infection transmitted by insects is possible but at most must be rare and although hereditary transmission cannot be denied it must be very exceptional. The principal danger is from the discharge of bacilli from the nose and skin but they may escape through the genito-urinary apparatus in milk tears and stool. DOULL (p 533) has investigated the effect of household exposure to leprosy among 8 007 individuals of 1 051 families in the Philippines, on the basis of person years of experience. The attack rates averaged 1.3 per 1 000 person years in those with house contact of one month or more and the maximum rate of 4.1 was found between the ages of 10 and 14. The annual risk of contracting the disease is 5.1 with contact and 0.9 without and is again highest in children of 10 to 14. The rate in exposed persons was 5.0 in males and 4.1 in females. No account was taken of the duration of house contact or of the type of case. KOESLAN (p 236) has estimated the relative degrees of contact experienced in families work and play circles and village communities in Java and shows that the incidence of leprosy varies directly with the intimacy and duration of contact. In the Panama Republic COURTNEY (p 1016) has traced a history of contact in 74 per cent. of the patients in the Palo Seco Colony and even more in new cases. The disease appears to be familial and the author considers inherited predisposition and prolonged intimate contact to be the factors

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin* 1939 Vol. 36. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

concerned. TOLENTINO (p. 531) considers that resistance and susceptibility to leprosy are probably transmitted hereditarily in Mendelian fashion, resistance being apparently the dominant and susceptibility the recessive character.

DEGOTTE (p. 1016) found an incidence of 44.37 per 1,000 definite and 19.53 suspected cases of leprosy in an examination of 8,294 natives of the general population in an area of the Congo in which the rainfall is heavy. Deficient sanitation and prolonged contact are regarded as factors influencing this heavy rate.

Three authors emphasize the benign character of leprosy in parts of Africa. MUIR (p. 531) reporting on leprosy in East Africa confirms the high incidence in the N.E. Belgian Congo, Uganda and Equatorial Sudan and states that in the uplands of Kenya it is less prevalent than on the coast and in Tanganyika. The severity of the disease, however, does not correspond with the incidence and this is attributed to the widespread infection involving even those with higher degrees of natural resistance who develop a mild form. GERMONT (p. 234) estimates the incidence of leprosy in Basutoland at a little over 2 per 1,000. The majority of the cases seen during a survey of the eastern border districts were remarkably benign and most of the recurrences were mild. There appeared to be no relationship between malnutrition, scabies and syphilis on the one hand and leprosy on the other and most infected families were well nourished. The incidence appears to be much greater in the highlands than in the lowlands. STRACHAN (p. 533) has had a similar experience in Basutoland and reports the existence of a large number of abortive cases. During 10 years 61 per cent. of early untreated VI cases appeared to undergo spontaneous arrest.

Discussing leprosy in India, JOSEPH (p. 532) confirms previously expressed views that the disease is most prevalent in hot, humid climates, and least prevalent at high altitudes where the vapour tension is low. Castes and marriage customs help to spread the disease and in schools and colleges the highest incidence is in children under 12 years. There is a high incidence in the poor who live in bad sanitary conditions. COCHRAN and RAJAGOPALAN (p. 238) in 1871 school-children in Soudapet, Madras found 40 with early and 3 with late signs of the disease and 65 who were probably leprotic.

In Burma, LOWE (p. 235) reports incidence rates rising from 1.6 per cent to 5 per cent and in children a rate of 5.6 per cent. with a higher preponderance (60 per cent.) of serious lepromatous cases than is found in India. He (p. 236) found that in Burma leprosy is more severe in the Burmans than in the Indians although many of the latter have contracted it in Burma. The disease develops at an earlier age in the Burmans and tuberculoid cases and nerve abscesses are rarer in Burma than in India. Since the Burmans are better fed than the Indians the author suggests that the lack of resistance to the infection among the Burmans is hereditary or racial. [See also TOLENTINO above.]

CILENTO (p. 1017) reports on a focus of leprosy in N. Queensland in which both whites and aboriginals are infected, and DAVIS (p. 1017) shows that in the north of Western Australia notifications have increased from 2-7 in 1908 to 1932, to 41-58 in 1933 to 1936 but in 1937 there were fewer.

SHIONUMA *et al.* (p. 236) consider that in Japan the leprosy seen in the warmer parts is less severe than that which is found in the colder areas.

KERVINGANT and BARÉ (p 1016) report 31.9 per 1 000 definite and 10.5 suspected in the natives of New Caledonia, and in Europeans rates of 5.2 and 0.5 respectively. They consider that the indigenous cases are stationary in number but the European cases are diminishing.

PIÑERO GARCIA (p 532) reports that in the Argentine the known incidence has risen from 1 to 2.5 per 10 000 between 1927 and 1937.

LOWE and CHATTERJI (p 534) consider that although leprosy may be occasionally transmitted by instruments used in scarification, tattooing or vaccination, more commonly there is a latent infection present at the time of injury. Leprosy lesions are frequently treated by scarification, tattooing and the application of the cautery or caustics.

OBERDÖRFFER (p 1021) repeats his hypothesis that leprosy is predisposed to in the tropics by the use of *Collocasia antiquorum* as food. This contains a highly toxic sapotoxin with a definite seasonal variation.

Aetiology

Reviewing the bacteriology of leprosy, MCKINLEY (p 1020) concludes that up to 1917 no organism had been isolated which had been established as the true leprosy bacillus. There is no reason to doubt the status of Hansen's bacillus which is so constantly associated with the disease and this will probably be cultivated at some time. In comment SCOTT refers to the apparently successful cultivation carried out at the Calcutta School of Tropical Medicine and to the success obtained by McKinley himself and DE LEOV with hormone-glycerol-agar. SUWO and KIN (p 1021) report some apparent success in cultivating leprosy bacilli (from leprosy tissues) in tissue culture. ROUSSEAU and GAUGEAT (p 539) claim to have cultivated the leprosy bacillus in a fluid *Aspergillus* medium and describe a cycle of development. ROUSSEAU and GAUGEAT (p 1021) claim to have cultivated the leprosy bacillus from tissues and blood with ease on Loewenstein's medium. EVANS (p 1021) obtained growth of chromogenic *Mycobacteria* (which she considers may be *M. leprae*) by using Clegg's method of symbiosis with other bacteria and amoebae.

BURNET (p 539) has confirmed Adler's success in transmitting human leprosy to the hamster. He infected one animal by inserting part of human leprosy beneath its skin. The spleen had not been removed. Attempts in 13 more hamsters, 4 white rats and one spermophile were unsuccessful. SELLARDS and PINKERTON (p. 242) have found that human leprosy material injected into *M. rhesus* produces only low-grade infection but rats infected intracerebrally from a monkey showed acid-fast bacilli up to 3½ years without the development of active lesions. TISSEUIL (p. 1019) failed to infect rats with human leprosy material to which were added various biological or chemical substances or other acid-fast bacilli but succeeded in producing new tuberculoid lesions in lepers by grafting into them skin from tuberculoid lesions of other lepers.

MARCHOUX and PRUDHOMME (p 240) have used a reducing colour reaction to differentiate living from dead leprosy bacilli *in vitro* and without cultures. By this test they find that the bacilli are killed by exposure to 60°C for 30 minutes but not for 15 minutes.

BERTRAND *et al* (p 1019) have investigated the pathogenicity of the Kedrovsky bacillus and conclude that it is a bovine type of *M. tuberculosis*.

Pathology

MARCHOUX and CHORINE (p. 540) state that human and rat leprosy bacilli cannot pass through unbroken skin but that the smallest superficial lesion will admit them. They pass through healthy mucous membranes, leaving no chancre, and are transported by leucocytes the local area and associated lymph glands showing the first evidences of invasion. Young experimental animals are not more susceptible than adults to the rat leprosy bacillus.

DES ESSARTS (p. 540) found that leprosy bacilli in those maculo-anaesthetic lesions in which they are present are situated chiefly in the Malpighian layer of the skin but that some are present in hair follicles and sweat glands, through which they may be eliminated. He therefore concludes that such cases may be a danger to others, though much less so than those with ulcers.

RADHA (p. 536) confirms the finding of ROGERS that in severe leprosy there is a decrease in blood lipase but that in patients improving under treatment with Asepol the lipase increases.

Clinical

BALJRA and BASCOMBRO (p. 233) suggest a clinical classification which cannot be further abstracted.

LOWE and CHATTERJI (p. 1015) in Calcutta have analysed the seasonal variations in clinical activity and bacterial findings observed in a large number of patients over a period of 3 years. There appears early in the year to be an increase in bacterial activity which ends abruptly in June. Corresponding variations in cellular activity follow these changes. The phenomena appear to be related to increased activity in the hot season, ending abruptly with the onset of the rains.

LARA (p. 533) has watched the children of lepers for the earliest signs of infection. These he finds on the arms, legs and buttocks, which are the areas most frequently in contact with the source of infection in the parents. In 14 of the 35 cases studied the first lesions were small single or multiple weal like and papular spots, the majority of which were positive on bacteriological examination. The average age at the first appearance was 19½ months.

DE MOURA (p. 237) in Paraná reports nodular leprosy in 14.4 per cent of cases. The initial lesions of all forms occurred most frequently on the face followed in descending order by the forehead, hands, feet and legs.

VAN BRUNEGHEM (p. 536) shows that nasal mucus from both nostrils should be taken in diagnosing leprosy since considerably more positive results are given than when one only is examined.

RADHA (p. 536) found leprosy bacilli in gland puncture material of 24.6 per cent of lepers examined and acid-fast bacilli in 4.8 per cent. of non-lepers but in some of the latter the bacilli could easily be distinguished from *Mycobacterium leprae*. NAIR and PANDALAI (p. 538) found acid-fast bacilli in the lesions of 57.27 per cent. of patients with neural leprosy.

Discussing leprosy lesions of the mouth, nose and larynx, PINKEKTON (p. 237) points out that there is atrophy and destruction of the cartilages of the nose and septum and escape of the bony structures, in which leprosy differs from syphilis. Nodular lesions may occur on the tongue, soft palate, epiglottis and larynx.

CORLEO (p. 244) describes 8 lepers with signs of infantilism which he considers may have been due to the disease acquired in infancy.

BOENJAMIN (p 244) discusses at length the differential diagnosis between nerve leprosy and syringomyelia in case of doubt he advises microscopic examination of a thickened nerve great auricular peroneal or ulnar

In a discussion of the tuberculoid form of leprosy RABELLO (p 239) points out that it occurs in 10 per cent. of Brazilian cases and that familial infections are frequent, though this form is scarcely at all contagious. The lesions result from bacilli distributed through the blood stream to skin nerves and lymph glands which are suitable for their growth TISSEUIL (p 240) concludes from experimental work that the spread of tuberculoid lesions is due to bacilli in the extending edge and not to trophic or toxic effects. PARMARSON (p 239) in Esthonia found tuberculoid changes to be peculiar to nerve cases the character of the lesions may be related to a certain degree of immunity

CASSIANO (p 535) notes that the leprosy reaction may resemble true erysipelas with fever erythematous oedema and subsequent desquamation These lesions, however only occur where there are cutaneous leprosy lesions are never infective or fatal and are not associated with a streptococcal

Diagnostic tests—DEGOTTE and DUBOIS (p 535) write of the value of the sweating test with Tr iodine and starch in the diagnosis of suspected cases of leprosy Pilocarpine or muscular exercise may be used to stimulate sweating

ROW (p 537) obtained strongly positive reactions in all cases of cutaneous leprosy tested by a complement fixation test in which a preparation made by prolonged autolysis of tubercle bacilli was used. The test was negative in nerve cases in which no bacilli could be found, and doubtful in tuberculoid cases. PEREIRA (p 242) gives figures of his experiences with the reaction of Lleras Acosta but has so far failed to obtain results confirming the work of that author GREVAL *et al* (p 537) found that the diagnostic value of the Witebsky Klungenstein and Kuhn reactions was only considerable in lepromatous cases the specificity is of a low order since the test is positive in certain other diseases. DI LIDDO (p 243) also considers this test to be of little value in diagnosis.

FICKER (p 537) reports favourably on a flocculation test which he has described. SPEIGHT (p 243) obtained positive serum formalin reactions in 55 per cent. of lepers tested. He (p 537) shows that the erythrocyte sedimentation rate is a good index to prognosis in leprosy

PARAS (p 245) has isolated different fractions of leprosy bacilli from nodules and finds that only the wax is active in producing skin reactions and that these are less intense than those evoked by the whole bacilli of the Mitsuda test.

Treatment

DE SOUZA ARAUJO (p 245) discussing treatment in general, advocates combined methods including surgical and electrical measures and the use of chaulmoogra preparations.

MANALANG (p 539) has investigated the effect of chaulmoogra preparations on leprosy bacilli in lymphatic glands removed at autopsy and kept in test tubes. The Cullon Mercado preparation was the most effective in causing disappearance of the bacilli and *H. wrightiana* oil and esters were most effective in removing acid fastness. In lepromatous lesions the same author (p 539) reports that intradermal

injections of preparations of *H. wrightii* lead to an increase in the proportion of non-acid fast forms of *Mycro leprae* found, and he regards these as degenerating forms.

The routine treatment at the Botsabelo settlement in Basutoland is by intradermal chaulmoogra esters, and GEORGE (p. 234) reports that 71 patients were discharged with disease arrested during 1937. McNAUGHTON (p. 532) uses iodized chaulmoogra oil injected intramuscularly as a routine treatment and reports unfavourably on methylene blue. Iodized ethyl chaulmoogra ethylate in low dosage intramuscularly is used by SARDJITO *et al.* (p. 235) at Blora in Java and it is the institution of treatment which has resulted in the voluntary presentation of early cases though it is too early to pronounce on the attainment of definite cure and improvement. BOEYJAMIN (p. 245) obtained satisfactory results with a Philippine preparation of iodized ethyl esters of chaulmoogra and gives details of administration. He treats the leprosy reaction by injections of omnadin. At the Central Leprosarium of Goa (p. 246) intravenous chaulmoogra oil, intramuscular E.C.C.O. or intradermal moogrol iodide are given, and chaulmoogra is given by the mouth or by intubation.

In advanced leprosy of the upper respiratory tract PINKERTON (p. 237) has not found chaulmoogra to be of much value but spraying the larynx with bland oils is soothing. Resting of the voice affords most relief.

ROSS (p. 246) has treated 5 patients by pyrethotherapy but gives no information as to results. Elaborate biochemical tests were made to determine the changes induced, which were all, however temporary only.

RADXA (p. 1021) points out that the urine of patients with lepromata may be found to contain leprosy bacilli during treatment for syphilis or yaws with N.A.B. although before such treatment the urine was free from the bacilli. Cases of this kind should therefore be treated in hospital.

For leprotic ulcers RYRIE (p. 247) has used Dettol with success both by injection of a 30 per cent aqueous solution into the affected tissues or by irrigation and dressing with a 10 per cent solution. Injections cause a rise in temperature but rapid improvement has been seen. Prolonged application as a dressing may lead to the parts becoming sodden. MEHTA (p. 247) reports that of 287 perforating ulcers 268 healed under a treatment consisting of the subcutaneous injection, at a site proximal to the lesion and also round it, of a freshly prepared solution of Rivanol 1 grain, glucose 2 grains, calcium lactate 1 grain, sodium thiosulphate 2 grains, water 10 cc. Intense pain, rigors and fever follow the injections. BERX (p. 247) recommends local application of cod liver oil combined with chaulmoogra.

Control

After a review of leprosy in East Africa based on a tour of inspection, MUIR (p. 531) makes suggestions for control. There should be a full-time expert to visit institutions and give advice. The voluntary system should be employed to attract patients since experience has led most British countries to abolish compulsion. Out-patient clinics may be useful if the patients can be followed to their homes and if examination of contacts can be carried out. Occupational therapy should be provided and education of patients attended to. RYRIE (p. 1018) refers to the "bugbear of compulsory institutionalism" as a large

factor in concealment of cases and advises the use of mobile units for survey propaganda and treatment in Malaya. GERMOYD (p 234) attributes the present satisfactory position in Basutoland to the activities of the Native Leprosy Inspectorate established in 1929. The employment of native inspectors is essential.

MUIR (p 1018) points out that in S Africa a modified form of compulsion is employed and in Nigeria a free colony system with outlying treatment dispensaries.

In Burma the villagers often isolate lepers at some distance from the villages and LOWE (p 235) advises that this system should be encouraged and that leper colonies should be founded at small cost. KERVINGANT and BARÉ (p 1016) show that in New Caledonia 10 leper colonies with good hygienic standards social amenities and dispensaries to supply regular treatment for infective patients have been instituted in recent years. Uninfective patients are treated in their own villages. Since however there is evidence that patients with neural leprosy may become bacteriologically positive both JEREMIAH (p 540) and BARTHOLOMEUSZ (p 540) advocate that they should be segregated [see also DES ESSARTS above *Pathology*].

Rat Leprosy

PRUDHOMME (p 240) shows that rat leprosy bacilli are killed by heating to 100°C. for 5 minutes by 1 in 100 formal in 15 minutes and by ultra violet rays in 10 minutes.

MARCHOUX and CHORINE (p 241) show that infection of white rats takes place with certainty after inoculation of 5 rat leprosy bacilli. GOMES (p 241) claims that rat leprosy bacilli and filterable forms of the same organism are eliminated in the nasal mucus of animals within 24 hours of infection. DE SOUZA ARAUJO (p 241) shows that in animals inoculated with rat leprosy bacilli inflammatory granulomata are produced, with bacillaemia and elimination of the organisms in the nasal mucus and in the faeces.

SELLARDS and PINKERTON (p 242) show that intracerebral injections of rat leprosy produce progressive lesions with frequent generalization in monkeys rabbits white rats and mice but not in guinea-pigs. The bacilli invade cells of the reticulo-endothelial system in many organs whereas non-pathogenic acid-fast bacteria do not produce metastatic lesions.

C Wilcocks

LEISHMANIASIS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Visceral leishmaniasis—CELIK (p 767) reports the first case of kala azar in an adult in Turkey. Canine kala azar is reported for the first time from the Niger Province by MORNET (p 768) and from Brazzaville by MALBRANT (p 768).

ADLER (p 768) records the effect of cultures of *L. donovani* inoculated into man although heavy infection resulted there were no symptoms of kala azar and the factors which determine individual susceptibility to kala azar are quite unknown. In certain phagocytic cells there were masses of parasites in others there were few.

CHUNG and WANG (p. 769) show that infection with *L. donovani* cured with neostibosan, protects hamsters against infection with *L. canis*. The same authors (p. 769) find that in hamsters, susceptibility to *L. donovani* infection is increased by splenectomy and by the administration of benzol.

SMITH *et al* (p. 769) report that sandflies kept alive, by feeding on raisins, for 10 days after infection, may become blocked with flagellates after the manner of fleas with plague bacilli. It seems probable that in attempting to feed, such flies must dislodge flagellates into the skin.

KIRK and LEWIS (p. 770) give information concerning the species of *Phlebotomus* found in the Sudan.

MURANO (p. 770) shows that increased production of complement in kala azar is associated with hyperplasia of the histiocytes, but that there is no relationship between the amount of complement and the number of leucocytes present in the blood.

KIRK and SATI (p. 771) have found puncture of the superficial inguinal lymph glands to be a simple and reliable procedure for the diagnosis of kala azar in the Sudan, and set down in detail the technique employed. They point out that in the Sudan skin lesions of the face, arms and legs are common in kala azar and that leishmaniasis may be found in scrapings from these.

YOUNG (p. 771) reports 136 cases of kala azar in N. China. Diagnosis was made as a result of spleen or liver puncture in all except 9. In smears from the spleen, heavily infected cells break up so that the leishmaniasis appear to be free but this is not so in tissue sections (see also FLAXER below). A positive aldehyde test was given in 91 per cent of cases. BRUMPT (p. 772) discusses sternal puncture in the diagnosis of tropical disease, emphasizing its special value in kala azar. He gives the average findings in myelograms in that disease. POPOTAS (p. 772) considers sternal puncture to be the best method for the discovery of leishmaniasis in suspected kala azar.

WANG (p. 773) reports a patient with kala azar in whom subcutaneous nodules, containing *L. donovani* were found.

HUANG (p. 773) reports 42 cases of acute agranulocytosis complicating kala azar in China. In 20 this was the result of kala azar and in 17 the result of treatment with antimony the various preparations of which are discussed from this point of view. A platelet count of over 100 000 indicates a good prognosis and in treatment the drug of choice is pentnucleotide.

HORGAN and KIRK (p. 774) point out that although the value of antimony in treatment is very great in India, China and the Mediterranean area, this is not so in the Sudan, where relapses after antimony treatment are relatively common and fatal. BHATTACHARJEE (p. 774) shows that alarming anaphylactic symptoms may occur after treatment with pentavalent antimony compounds. Methods of prevention and treatment are given.

SUN and CHANG (p. 775) report that a new pentavalent antimony compound "Distibinyl" is as efficacious as other compounds in the treatment of kala azar but is cheaper. Details of dosage are given.

ADLER and TCHERNOMORETZ (p. 775) show that 4,4-diamidino stilbene has a marked effect in eradicating *L. donovani* infection of hamsters, and ADAMS and YORKE (p. 775) report definite signs of improvement in an Indian with kala azar who was given 360 mgm. of this drug during 8 days treatment. ADLER and RACHMILEWITZ

(p 776) report success in treatment with the same drug in a patient in Palestine

Muco-cutaneous leishmaniasis —PESTANA and PESSÔA (p 776) report a small endemic focus of cutaneous leishmaniasis in the municipality of São Paulo

FLAKER (p 776) has studied leishmania from oriental sores and concludes that although the normal method of reproduction is by binary fission true schizogony also takes place. He states that extracellular schizonts may be found but WENYON in comment points out that the author has made these observations on smear preparations which give misleading appearances because large infected macrophages suffer damage in the process of smear making and that small portions of broken-off cytoplasm of these cells containing a number of parasites may easily give the impression of extracellular multinuclear forms [see also YOUNG above]

TRIFILÒ (p 777) reports a lesion of the tongue in which *L. tropica* were found. BERLIN (p 777) notes a condition seen in Palestine in which after healing of cutaneous leishmaniasis there appear secondary lesions in the scar tissue. These are very indolent but heal spontaneously. They resemble lupus and only rarely can leishmania be found. Papules of the extremities were also seen in one case

BENDER (p 778) describes a patient with a condition which he diagnosed as muco-cutaneous leishmaniasis claiming it to be the first autochthonous case in the U.S.A. In comment however WENYON states that on the evidence given the diagnosis cannot be accepted, and gives his reasons for this view

GOMES (p 778) describes the intradermal reaction in which the antigen consists of washed flagellates in saline. It is a group reaction in leishmaniasis.

AKRAWI (p 779) records cure within a month in 63 per cent. of a series of oriental sores in Baghdad by means of local application of powdered M & B 693. SENEKJI (p 779) shows that trypanflavin and certain other drugs are actively lethal to leishmania in culture and that trypanflavin causes immediate lysis of the flagellates. Sulphanilamide has only slight inhibitory action

In Italy there is little doubt that the vector of oriental sore is *Phlebotomus perfiliewi* (*P. macedonicus*) and VANNI (p 779) shows that breeding takes place in dung heaps. If these are near the houses the disease occurs, but it is practically absent in those districts in which the heaps are not allowed within 80-100 metres of the houses. Prophylactic measures may be based upon this fact together with protection by nets and treatment of cases [For treatment with vanadium see PEREIRA below p 818] C Wilcocks

CELIK (O Serefettin) Le premier cas de kala-azar chez l'adulte en Turquie. [First Case of Kala Azar in an Adult in Turkey]—*Bull Soc Path Exot* 1940 Jan 10 Vol. 33 No 1 pp 14-18

The only cases of kala azar hitherto reported from Turkey have been in children. The present case is the first to be noted in an adult. The patient a man 37 years of age had lived in Istanbul for seven years but seven months before his illness commenced he had visited his native town of Ineboli on the Black Sea, which is known to be an endemic focus for infantile kala azar C M Wenyon

- ASSIEN TAHAR (S) EERKENS (J W) DJOEHANA (R. Id) & SARDJITO
Een geval van kala-azar [A Case of Kala Azar]—*Geneesk.
Tijdschr v Nederl. Indië* 1940 Feb 6 Vol. 80 No 6 pp 347-
350 With 7 figs on 1 plate.

A case of kala azar in a Chinese who came to the E. Indies from Shantung a year before the first symptoms of abdominal pain and fever became manifest. This case, like others which have been noted in the E. Indies is evidently one in which infection had been acquired before arrival in this country which is not an endemic centre of the disease. C M II

- MORNET (P) Un cas de leishmaniose canine au Niger [A Case of Canine Kala Azar in the Niger Territory]—*Bull. Soc. Path. Exot.* 1940 Apr 10 Vol 33 No 4 pp 253-256.

Though cases of kala azar in dogs have been reported on a number of occasions from Dakar this is the first record of the canine disease in the Niger Province, where the author was able to diagnose a case by the discovery of leishmania in a number of skin lesions from which the dog suffered. A cure was obtained by the use of stibyl.

C M II

- MALBRANT (R) I Existence de la leishmaniose canine au Congo Français II Ankylostomose canine et formol-gélification. [Existence of Canine Kala Azar in the French Congo. II Canine Ankylostomiasis and Formal-Gelification.]—*Bull. Soc. Path. Exot.* 1940 Jan 10 Vol 33 No 1 pp 12-14

The paper records the discovery of three cases of canine kala azar in dogs in Brazzaville French Equatorial Africa. This is the first discovery of the canine disease in this colony, where two human cases have already been reported. One of the dogs in question had been imported from France but the other two were of local origin.

C M II

- ADLER (S) Attempts to transmit Visceral Leishmaniasis to Man. Remarks on the Histopathology of Leishmaniasis.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940 Jan 29 Vol. 33 No 4 pp. 418-437 With 3 plates & 8 figs. [12 refs.]

Working with three strains of *Leishmania donovani* of Indian origin, the author attempted to infect 5 cases of inoperable carcinoma by the injection of massive doses of cultures of this organism and in two of the cases by additional injections of emulsions of the organs of heavily infected hamsters. Only one of the patients who received injections of cultures alone became infected. Though a heavy infection resulted, no symptoms of kala azar developed during 9 months' observation. There was no marked enlargement of the spleen and neither fever nor leucopenia. At post mortem examination two types of cell infection were noted: in one the cytoplasm was packed with parasites as in the case of reticular cells of the spleen and Kupffer cells of the liver; in the other there were few parasites in the cell as in the case of adventitial cells of the arteries, Gibson's capsule trabeculae of the spleen, and connective tissue of the stroma of the malignant growth.

All these cells are evidently phagocytic. Though the Kupffer and other cells were packed with parasites they still were capable of phagocytosing plasma cells, lymphocytes and even other infected cells. It was shown that the serum of the infected patient had a lytic action on the flagellates grown in cultures from this case. The factors which determine individual susceptibility to kala azar are quite unknown.

C M H

CHUNG (Huei Lan) & WANG (C W) The Immunity to Infection with *Leishmania canis* of Hamsters Recently Cured of *Leishmania donovani* Infection.—*Chinese Med J* 1939 Dec Vol 56 No 6. pp 519-522.

Five Chinese hamsters which had been cured of experimental *Leishmania donovani* infections by subcutaneous injections of neostibosan were inoculated intraperitoneally, together with 5 control hamsters with emulsion of the spleen of a hamster which had been infected with the local *L. canis* from a naturally infected dog. All the 5 control animals developed heavy infections but of the cured animals only two became lightly infected. This suggests that the human and canine strains in N. China are either identical or very closely related to each other. In an earlier paper WANG and LEE (1928) showed that of 12 hamsters cured of infection with a human strain 8 were refractory to reinoculation with the same strain.

C M H

WANG (C W) & CHUNG (Hui-Lan) Splenectomy and Benzol Injection as Means of Increasing Susceptibility of Chinese Hamsters to Kala-Azar.—*Proc Soc Experim Biol & Med* 1940 May Vol. 44 No 1 pp 35-38.

The authors have made a careful comparison between three groups of hamsters as regards their susceptibility to intraperitoneal injection of the culture forms of *Leishmania donovani*. The first group were animals which had recovered from splenectomy, the second group animals which had received 0.5 cc. to 2 cc. of a mixture of equal parts of benzol and olive oil 30 hours to seven days before injection of flagellates and the third group were normal animals. Susceptibility was gauged not only by the presence of leishmania but also by the intensity of infection. It was found that susceptibility was increased both by splenectomy and benzol but that the former was more marked in its action in this direction.

C M H

SMITH (R. O. A.) HALDER (K. C.) & AHMED (I.) Further Light on the Mechanism of Sandfly Transmission of Kala Azar.—*Indian Med Gaz* 1940 Feb Vol. 75 No 2. pp 67-69.
INDIAN MEDICAL GAZETTE 1940 Feb Vol. 75 No 2. pp 97-98 —
The Transmission of Kala-Azar

The paper records important observations on the habits of sandflies (*Phlebotomus argentipes*) in captivity which may help to explain the method of transmission of kala azar. It has been noted that these flies after feeding on a case of kala azar may be kept alive more readily not by giving them successive blood meals but by allowing them to feed on raisins as is commonly the practice with captive mosquitoes. Not only do the sandflies live longer but the flagellate development is

cent. of the cases tested. An abnormal appearance of the leishmania from one case is noted. This consisted of the presence of a large vacuole which pressed the nucleus and the kinetoplast to the side of the parasite giving the appearance of a ring. It is noted that in smears of the spleen the heavily infected cells break up so that many leishmania are free. It is pointed out that such an appearance is artificial for in sections of the same tissue all parasites are intracellular. A search for parasites in nasal secretions in 26 cases was negative.

C. M. IV

BREVERT (L. C.) La ponction médullaire dans les maladies parasitaires. *Medullary Puncture in Parasitic Diseases.*—Ann. Parasit. Humaine et Compars 1939-1940 Vol. 17 No. 6 pp. 481-514. With 1 fig. & 1 plate. [Bibliography]

This is a comprehensive article on the subject of sternal puncture particularly in its application to the diagnosis and study of tropical diseases. An historical survey of the introduction of the procedure of examination of bone marrow by PIAZZESI, GHEDINI and SEYFARTH is followed by a description of the technique and apparatus required for puncture of the sternum. It would appear that of tropical diseases kala azar is the one for which the operation is most useful. Compared with spleen puncture sternal puncture has much to recommend it. It is easy to carry out, requires no previous preparation of the patient, is free from pain except at the moment when marrow is actually being drawn into the aspirating needle. Furthermore the repeated often during the course of treatment. Compared character and proportions of cells present, giving what is termed the myelogram, afford valuable information of prognostic value. In 38 myelograms from cases of kala azar the following average percentages were obtained—granulocytes 23 erythroblasts 24 hyaline leucocytes 53. Normally the granulocytes are four times as numerous as the erythroblasts and 3.5 times as numerous as the hyaline leucocytes. A very useful semi-diagrammatic plate shows the presence of parasites in the sternal marrow of a patient with kala azar and the presence of parasites in a haemohistioblast, their usual habitat.

The procedure of sternal puncture is of less value in trypanosomiasis, malaria, filariasis and spirochaetosis, but it would probably be of diagnostic value in mycotic conditions such as histoplasmosis. In all cases, however, the myelogram throws light on the various anaemic conditions which result from so many infections in the tropics. The paper concludes with a long list of references.

C. M. IV

POROTAS (Ch.) Bedeutung der Sternalpunktion für die Diagnose der Kala Azar. [Importance of Sternal Puncture for the Diagnosis of Kala Azar].—Arch. f. Schiffs u. Trop. Hyg. 1940 Feb. Vol. 44. No. 2 pp. 78-80.

The author working in Greece has come to the conclusion that sternal puncture is the best method for the discovery of leishmania in cases of suspected kala azar. He gives notes of three cases in which spleen puncture and both the formal gel and antimony reactions were negative while sternal puncture enabled a demonstration of the presence of leishmania to be made.

C. M. IV

WANG (C W) A Kala-Azar Patient with Subcutaneous Nodules containing Leishman-Donovan Bodies.—*Far Eastern Assoc Trop Med C R Dixième Congrès Hanoi 26 Nov-2 Dec 1938* Vol. 2. pp 113-116 With 4 figs. on 2 plates

The patient was a Chinese school teacher aged 35 years showing small nodules on the skin of the arms 16 in number moveable measuring 2-6 mm. in diameter They were found to consist of proliferating reticulo-endothelial cells and masses of lymphocytes and in the former were many L D bodies. The author adds— It is obvious histologically that these nodules have nothing in common with dermal leishmaniasis though he does not particularize in what respects they differ The infection was chronic and severe (as is the case with dermal leishmanoid) and an intensive treatment with urea stibamine about double the average total dosage for an ordinary case was needed He avers also that subcutaneous nodules containing Leishman Donovan bodies have never been observed before in kala azar H H S

HUANG (C H) Acute Agranulocytosis in Kala-Azar —*Chinese Med J* 1940 Feb Vol. 57 No 2 pp 119-140 With 6 charts. [10 refs.]

The occurrence of acute agranulocytosis as a complication of kala azar was first noted in N. China by ZIA and FORENER who gave an account of 8 cases [this *Bulletin* 1935 Vol 32 p 483] The present paper deals with 42 cases (including the eight cases just mentioned) which have been treated in the hospital of the Peiping Union Medical College during the past 10 years. During this period 554 proved cases of kala azar were admitted to hospital and the complication occurred in 42 or 7.6 per cent. of these whereas only 20 cases were observed unassociated with kala azar The 42 cases were classified as acute agranulocytosis not merely because the granulocytes were below 20 per cent but also because of their sudden fall to this low figure. In the case of infants who have normally a lower granulocyte count than adults, a rapid fall to less than 10 per cent in association with typical angina was required before a diagnosis was made. Of the cases 38 showed the characteristic picture of fever throat or skin lesions and marked granulocytopenia. The four other cases had no ulceration or exudate on the pharyngeal mucosa. The throat condition in some of the cases showed a similarity to faucial diphtheria. In the series it was possible to determine that 20 cases were the result of kala azar and 17 the result of the treatment with neostibosan or ureastibamine. The cause whether kala azar or antimony in the other cases was undetermined. Among the 20 cases there were 2 deaths while among the 17 there were 5 deaths. It would thus appear that the condition resulting from the antimony treatment was more serious than that arising from the leishmania infection. The mortality from acute agranulocytic angina due to other causes was 11 in the 20 cases seen. As regards the rôle of the antimony drugs used in the 17 patients (one of whom had two attacks) neostibosan was responsible for 13 attacks and ureastibamine for only 5. This is remarkable in that ureastibamine is more toxic than neostibosan as regards nausea vomiting chills, headache vertigo and other reactions moreover it was more frequently used than neostibosan. It is suggested that antimony intoxication induces a sudden

change in the number of granulocytes and that this favours the development of the acute condition. In this connexion it may be noted that ureastibamine contains less antimony than neostibosan and is thus less likely to lead to antimony intoxication. It requires to be given over a longer period but the therapeutic effects are better than those obtained with neostibosan. As regards treatment of the condition, in 40 cases 13 received no treatment, with 4 deaths 12 were given blood transfusion, with 2 deaths, while of 9 cases treated with pent nucleotide one died. It is admitted that it is difficult to draw conclusions as to the relative value of the various methods of dealing with the cases in such a small series particularly as there was considerable individual variation as regards number of neutrophils in the blood, quantity of haemoglobin, number of platelets and the general condition. It would seem that a platelet count of over 100 000 is a good feature from the point of view of prognosis. The drug of choice appears to be pentnucleotide but further studies are required before a final conclusion can be drawn. Blood transfusion did not seem to be very helpful. After recovery from acute agranulocytosis due to kala azar there is a tendency towards relapse so that antimony treatment should be resumed as soon as possible to prevent such recurrences.

C M W

HORGAN (E. S.) & KIRK (R.) Antimony Treatment of Kala-Azar
[Correspondence].—*Nature* 1940 Feb 10 Vol. 145 No 3667
p 228.

The note by Sir Leonard ROGERS in *Nature* [this *Bulletin* 1940 Vol 37 p 350] in which he points out the value of antimony in the treatment of kala azar has led the writers of this letter to the Editors to state that though good results have followed the use of antimonials in India China and the Mediterranean area, this is far from being the case in the Anglo-Egyptian Sudan, where relapses after such treatment occur in a considerable proportion of the cases. The immediate response may be good, but when relapse occurs there appears to be considerable resistance to further antimony treatment so that the majority of relapse cases terminate fatally.

C M W

BHATTACHARJEE (Jagadish C.) Toxic Reaction after Pentavalent Antimony Injections.—*Med Bull Bombay* 1940 Jan 6.
Vol 8 No 1 pp 5-7

Though pentavalent antimony compounds are less toxic and more efficacious in the treatment of kala azar than antimony tartrates they sometimes produce alarming symptoms of an anaphylactic character which may even lead to collapse and death. The more common toxic symptoms are vomiting fits of coughing flushing of the face, faintness and diarrhoea, which usually appear after a number of injections have been given and the maximum dose reached. Much can be done to avoid symptoms by giving the injections slowly using fresh double-distilled water employing drugs which are not too old, and keeping the patient lying down for half an hour after administration of the drug. If severe reactions occur adrenalin pituitrin and ephedrin may be given.

It does not seem possible to avoid reactions entirely, for as long as antimony is to be used for the treatment of kala azar these will occur

C M IV

SUN (C Jung) Notes on the Kala-Azar Research in China. The Use of "Distibinyl" in the Treatment of Chinese Kala-Azar—*Indian Med Gaz* 1940 June Vol. 75 No 6 pp 332-336 With 1 plate

— & CHANG (S.) Notes on the Kala-Azar Research in China. Part II. The Use of "Distibinyl" in the Treatment of Chinese Kala-Azar—*Chinese Med J* 1940 May Vol. 57 No 5 pp 442-448

The successful treatment of kala azar in China, as indeed in other endemic foci of the disease, is chiefly related to the cost of the various pentavalent antimony compounds available. Attempts have accordingly been made in the Department of Chemistry and Pharmaceutics of the Central Field Health Station Nanking China to prepare a pentavalent compound equal in efficacy to but cheaper than others which are on the market. The result is a drug which has been given the name Distibinyl. It is a powder of a greyish white colour unstable if exposed to the air. It is given intravenously dissolved in distilled water by injections daily or every other day. The initial dose is 0.025 gm. for infants and from 0.05 to 0.1 for adults. The maximum dose for an infant is 0.2 gm. and for an adult 0.3 gm. The total dosage per 45 kilo body weight has varied from 1.15 to 2.89 gm. with an average of 2.10 gm. in cases which were cured. The conclusion reached is that the new drug is just as efficacious as other preparations but has the advantage of being less costly. It is not stated however what system of costing was adopted for arriving at the estimated cost of production.

C M IV

ADLER (S.) & TCHERNOMORETZ (I) The Action of 4, 4 Diamidino Stilbene on *Leishmania donovani* in the Syrian Hamster *Cricetus auratus*—*Ann Trop Med & Parasit* 1939 Dec 30 Vol. 33 Nos 3 & 4 pp 318-322. With 2 plates.

The paper shows that the drug in question when administered to hamsters experimentally infected with *Leishmania donovani* in repeated doses of 2.5 to 40 mgm. per kilogram of body weight has a marked action on eradicating the infection. An account is given of the changes which occur in the spleen as a cure is being effected.

C M IV

ADAMS (A. R. D.) & YORKE (Warrington) Studies in Chemotherapy XXIII.—A Case of Indian Kala-Azar treated with 4, 4 Diamidino Stilbene.—*Ann Trop Med & Parasit* 1939 Dec 30 Vol. 33 Nos. 3 & 4 pp 323-328 With 2 charts & 1 fig

The case recorded is that of an Indian 31 years of age who was cured of kala azar by eight intravenous injections of the drug administered in daily doses of 1.0 mgm. per kilo. of body weight. In all 360 mgm. were given during the eight days. The definite signs of improvement such as the return of the temperature to normal and the retraction of the spleen did not commence till after the course of treatment had been completed.

C M IV

ADLER (S) & RACHMILEWITZ (M) A Note on the Treatment of a Case of *Leishmania infantum* with 4,4 Diamidino Stilbene.—*Ann Trop Med & Parasit.* 1939 Dec. 30 Vol. 33 Nos 3 & 4 pp 327-330

The paper gives an account of the treatment of a woman, 32 years of age who contracted kala azar in Palestine, presumably in the early part of 1938. In April 1939 after the diagnosis had been established, a course of stiburamine was given. The patient was apparently cured and was discharged from hospital in good condition but later in the year the symptoms returned and cultures of leishmania were obtained from the sternal marrow. Two intravenous injections of 60 mgm. of diamidino stilbene followed by three intramuscular injections of 100 mgm were administered. The treatment was interrupted owing to an attack of amoebic dysentery for which injections of emetine were given. The dysentery having subsided, the kala azar treatment was resumed and 18 intravenous injections of the diamidino stilbene (100 mgm in 30 cc of distilled water) were given between July 21st and September 7th. By October 8th the patient was in excellent condition, though there was still some enlargement of the spleen. The patient was discharged from hospital and is under observation as an out patient. In view of the size of the spleen, the edge of which was below the umbilicus and its hardness, the result obtained is regarded as satisfactory.

C M IF

PESTANA (Bruno Rangel) & PESSÔA (S B) Leishmaniose tegumentar autoctone no município de São Paulo (Endemic Cutaneous Leishmaniasis in São Paulo).—*Ann Paulist Med e Cirurg* 1939 Dec Vol 38 No 6 pp 435-442 With 4 figs.

The paper calls attention to previous records of two cases of cutaneous leishmaniasis in the municipality of S. Paulo in Brazil and gives notes of five further cases seen by the authors. These indicate that a small endemic focus of the disease exists in the neighbourhood of S. Amaro. The cases were diagnosed by the discovery of leishmania or by the skin test of MONTENEGRO. Blood examinations show that the disease is associated with a distinct monocytosis.

C M IF

FLAHER (Franco) Bisher unbekannte Reproduktionsarten der Leishmanie bei Orientbeule. [Hitherto Unknown Methods of Reproduction of Leishmania in Oriental Sore].—*Arch f Schiffs u Trop Hyg* 1939 Sept Vol 43 No 9 pp 383-403 With 156 figs

The author has carried out a detailed study of leishmania as they appear in smears from oriental sores particularly from the point of view of the method of reproduction. It is admitted that the normal method is by binary fission but this may take place in many different ways owing to variations in the disposition of the daughter nuclei and kinetosomes in the dividing parasite. In addition, many abnormal division forms occur but it would seem that these are of little significance from the point of view of the development of the parasite. The vexed question of schizogony is discussed and, though the author admits that in many cases closely packed individual parasites may give the appearance of schizonts, there are in addition true schizonts in which a single parasite contains many nuclei resulting from nuclear

divisions not being immediately followed by cytoplasmic division. There are thus pseudoschizonts and real schizonts. These are spoken of as either intracellular or extracellular [but the author does not appear to appreciate fully that such distinctions cannot be drawn with reliance from appearances in smear preparations in which the large infected macrophages and other cells suffer damage in the process of film making. It would have been more instructive to examine sections of sores which have been fixed without disturbance of the cells. It can readily be seen in sections that parasites are practically always intracellular and it is safe to make the deduction that the extracellular forms seen so commonly in smears are in this position as a result of mechanical damage to cells. Small portions of broken-off cytoplasm of cells containing a small number of parasites may easily give the impression of multinuclear forms.] The paper is profusely illustrated there being 156 figures of the various forms described. C M W

TRIFILÒ (Nino) Su di una rara localizzazione della *leishmania tropica* [Unusual Position for *Leishmania tropica*].—*Rass. Sanitaria dell' A.O.I.* Addis Ababa. 1939 Sept 9 Vol. 1 No 3 pp 31-34

The patient 53 years of age who had been in Italian East Africa since 1938 noticed in 1939 a slightly raised red area on the left margin of the anterior third of the tongue. This developed slowly in an indolent manner and finally ulcerated. Preparations of the secretion from the sore were submitted to the laboratory at Asmara for examination. The report stated that *Leishmania tropica* was present. [See also this *Bulletin* 1939 Vol. 36 p 1031] C M W

BERLIN (Chaim) *Leishmaniasis Recidiva Cutis Leishmanid.*—*Arch. Dermat. & Syph.* 1940 May Vol. 41 No 5 pp 874-886 With 6 figs [18 refs.]

The author has noted in Palestine that in certain cases of cutaneous leishmaniasis or oriental sore after healing and scar formation there appear secondary lesions in the scar tissue. These have the form of flat round, pinhead-sized to lentil-sized moderately firm reddish brown papules which lie singly or grouped and coalescing. The course is protracted the lesions remaining unchanged for several years. They produce no subjective symptoms and disappear spontaneously leaving varioliform scars. The condition resembles lupus vulgaris but usually no organisms are to be found in smears from the lesions. In only 3 of 13 cases noted by the author were leishmania discovered, and then they were scanty. It would seem that with the healing of the primary oriental sore isolated parasites have remained enclosed in the scar tissue and that by very slow development these give rise to the secondary lesions. In one of the cases the development of the secondary lesions in scar tissue in the face there appeared papules in the extremities. Though leishmania could not be found in these papules it is considered that they were due to infection with these parasites. They persisted for one and a half years and cleared up after treatment with sodium aurothiomalate. The condition described in the paper has been observed by a number of earlier observers whose papers are referred to by the author. A series of excellent photographs shows the character of the lesions. C M W

BERENDEK (Tibor) American Leishmaniasis. Report of the First Antochthonous Case in the United States.—*Jl. Trop. Med. & Hyg.* 1940 June 1 & 15 Vol 43 Nos 11 & 12. pp 147-153 164-168 With 8 figs. [31 refs.]

The case described is that of a man, 26 years of age who had lived all his life in the U S A except for 4 years spent in Poland in his childhood. The disease from which he suffered commenced in 1933 by swelling of the cartilaginous parts of the nose. About 4 months later the septum collapsed, while later still ulceration of the lips and cheek commenced, producing a condition resembling the mucocutaneous leishmaniasis of Brazil. Finally the bones of the limbs became involved in circumscribed areas of osteomyelitis. The Wassermann reaction was positive the patient being a congenital syphilitic. The author claims that he discovered leishmania in the lesions in large numbers and also in the blood, as evidenced by their presence in fluid from cantharides blisters. It is stated that gummas were inoculated successfully an acute ulcerative condition of the head involving the eyes, being produced, associated with the presence of leishmania in the lesions and in the internal organs. The parasites were studied in stained films and also as the author states, in fresh material under the cover glass. (An illustration shows in 90 figures what are regarded as budding forms of leishmania. These if organisms at all, must be yeasts. This remark applies also to the figures of the typical leishmania, which are quite unlike these parasites. It is evident that the author has had little experience of leishmaniasis as his statements regarding the organisms he has seen are incompatible with such an identification. The case cannot be accepted as one of American leishmaniasis on the unsatisfactory evidence brought forward.] C A W

GOODES (Luis de Salles) A intra-dermo-reacção de Montenegro na leishmaniose e outras pesquisas afins [Intradermal Reaction of Montenegro in Leishmaniasis].—*Brasil Medico* 1939 Dec 2 Vol 53 No 49 pp 1079-1087 With 3 figs. [10 refs.] English summary

The author has followed up the work of MONTENEGRO (1926) on the subject of skin reactions following injections of leishmania antigen in cases of S. American cutaneous and mucocutaneous leishmaniasis [see this Bulletin 1928 Vol 23 p 585]. The antigen the author has employed consists of a suspension of washed flagellates in physiological salt solution containing four parts of phenol per thousand. Before use the antigen was kept at 2° to 4°C for 10 days. The test is carried out by injection into the skin. Of 120 observations 97.5 per cent. gave a strongly positive or a moderate but conspicuous reaction while 2.5 per cent gave weak reactions, perceptible, however up to 72 hours after the injection. Two suspensions which had been kept in the ice box for 18 months had lost, when tested, little of their original potency. It was noticed that when antigen was injected intravenously allergic shock resulted and the intensity of this in any one case was directly parallel to the intensity of the skin reaction given by the skin test. The local and general reactions to the antigen are group reactions as far as species of leishmania are concerned. It was not given by cases

with other types of skin disease nor by cases of S American trypanosomiasis. In honour of Montenegro who introduced the test in 1926 the author thinks it should be known as the Intra-dermal Reaction of Montenegro C M IV

AKRAWI (F) The Local Treatment of Ulcerated Oriental Sore by the Powder of Certain Sulphonamide Derivatives.—*Jl Trop Med & Hyg* 1940 Jan 1 Vol. 43 No 1 pp 4-6

The paper records the treatment of a series of 72 cases of ulcerating oriental sore in Baghdad with M & B 693 or Uleron. The drug is applied directly to the sore in powder form after cleansing with saline solution. Of the cases treated 37.7 per cent. were cured in 15 days or less and a further 25 per cent. within a month. Thus 63 per cent. were cured in a month's time a result which is distinctly better than that obtained with other forms of treatment. It would seem that the rapidity of cure in some cases shows that the drug acts not merely by suppression of secondary infections. An advantage of the treatment is that there is no destruction of tissues and consequently a good scar is produced. C M IV

SENERJI (H A) A Comparison of the Efficiency of Certain Drugs and Dyes in Killing Cultures of *Leishmania tropica*—*Jl Path & Bact* 1940 Jan. Vol. 50 No 1 pp 171-176

— The Effect of Sulfanilamide and Trypaflavin on Cultures of *Leishmania tropica*—*Jl Infect. Dis* 1940 Mar-Apr Vol. 66 No 2. pp 111-112.

The author has exposed standard emulsions of washed flagellate forms of *Leishmania tropica* to the action of a number of drugs including sulphanilamide derivatives and disinfectant agents in varying dilutions and for varying times. After exposure fresh culture medium was inoculated from the treated flagellates but the author does not state that the flagellates were washed free of reagent before their viability was tested in this way. It would seem that a fallacy has been introduced by this omission. However this may be it is noted that the most actively lethal substances were trypaflavin, eusflavin, rivanol and the green and violet dyes. In these studies the author has used his own culture medium [this *Bulletin* 1939 Vol. 38 p 1024].

In the second paper the author describes further experiments with sulphanilamide and trypaflavin. The former has little action on the flagellates which are able to continue their growth in certain concentrations of the drug. There is only a slight inhibitory action even in the presence of whole blood. This action is a direct one, phagocytosis playing no part in the process. Trypaflavin on the other hand is highly toxic causing immediate lysis of the flagellates.

C M IV

VANNI (Vittorio) Epidemiologia, trasmissione e profilassi della leishmaniosi cutanea in Italia. [Epidemiology, Transmission and Prophylaxis of Oriental Sore in Italy]—*Ann. d'Igiene* 1940 Feb Vol 50 No 2. pp 49-58. With 4 figs. [13 refs.]

A study of the epidemiology of oriental sore in the provinces on the Adriatic coast of Italy has shown a definite association of *Phlebotomus*

perfillens (syn. *P. macrobuccus*) with the disease so much so that it is little doubt that this species is the vector in these districts. Observations have shown that the breeding places of this insect are the dung heaps which vary in distance from the rural houses, the inhabitants of which are human beings on the upper floor and horses and cattle on the lower. It would seem that the incidence of oriental malaria is in direct relationship to the proximity of the dung heaps to the houses. In the province of Campobasso where a local law prohibits the formation of dung heaps within 80 to 100 metres of the houses, malaria is practically non-existent though the sandfly vector is there. It is evident that prophylactic measures can be based on this knowledge and consist in protection from bites by suitable nets, removal of dung heaps if these are too near the houses, cure of the cases by means of local streptom injections or intramuscular Fouadin, and distribution of information.

C. A.

MALARIA

PROCES OF ABSTRACTS IN THIS SECTION

BAERAS (p. 782) reports investigation in a part of the Ph. Islands in which there had occurred an epidemic of malaria. The cause of the epidemic was not clear. RUSSELL *et al.* (p. 782) findings in the examination of children in two areas in S. India. In one malaria is transmitted throughout the year. In the other transmission is seasonal in accordance with irrigation and is of introduction.

YOUNG *et al.* (p. 783) describe the development of trophozoites and oocysts of *P. malariae*.

VARGAS and FREIRE (p. 784) describe the methods they used to collect and colour mosquitoes in studies to determine their range of flight.

COCHRAN and KISHITZ (p. 784) give a detailed account of the life history of *A. maculipennis* var. *atroparvus* in Portugal. Breeding takes place in the most part in the rice fields which are flooded from 15 September to 15 October. The larvae can withstand fairly high water temperature and are found in water the salinity of which lies between 130 mgm per litre. Females do not usually hibernate in the relatively mild winter but move into the open and feed on the warm-blooded animals. In June larvae may number 400 per square metre in the rice fields. Sheds containing animals are preferred as shelters, but houses are invaded if the mosquitoes are numerous. Feeding takes place in the open. Animal blood is preferred but humans are attacked if the mosquito density is high and endemic malaria is present. Fluctuates with mosquito density. WEYER (p. 786) states that in N. Germany, during the last 8 years there has been no change in the racial composition of the *Anopheles maculipennis* populations.

In a malaria survey of Mombasa, WEISMAN *et al.* (p. 786) show the incidence is high, with peaks after the two rainy seasons. The number and distribution of the vector is not uniform but is

point out that this coastal area would almost certainly become an endemic area should yellow fever be introduced. *Culex fatigans* is the commonest mosquito in houses and is a known vector of *W. bancrofti* and filariasis occurs in this area. Recommendations for mosquito control are given. ADAMS (p 788) shows that *A. funestus* can travel 4.5 miles down wind and 1.5 miles at an angle of 30° up wind. *A. gambiae* can travel 4.25 miles down wind and 1.5 miles at a right angle to the wind.

HINMAN and HURLBUT (p 788) state that in the Tennessee valley *A. quadrimaculatus* passes the winter solely as a hibernating female after insemination. They (p 788) find that shading of breeding places appears to have only slight effect in reducing the number of larvae of this mosquito.

BLACK (p 789) reports transmission of malaria from one patient to another in the course of intravenous neocarsphenamine injections owing to the use of tubing which was contaminated by the blood of each patient and which was not changed for each patient. CHUNG *et al* (p 789) in reporting malaria in heroin addicts state that they have found *P. falciparum* and *P. vivax* in the residual fluid of syringes used in heroin dens.

SCHILLING (p 790) records further work on the immunization of man against malaria and states that adult man possesses a natural resistance against minimal numbers of both schizonts and sporozoites of the Madagascar strain of *P. vivax* and that this may be increased by subcutaneous inoculation of increasing doses of schizonts and sporozoites though the latter are uncertain in their action.

CANNATA (p 790) reports two cases in which unsuspected malaria became active during the course of acute infectious disease. LERICHE (p 790) reports gingivo-stomatitis complicating malaria. CASQUEIRO (p 791) describes the delayed retraction of the uterus which may occur in malarious patients.

CRAIG (p 791) in protesting against the short term treatment of malaria with quinine states that there is no adequate evidence that it results in any immunity. It is dangerous in that it does not prevent the development of pernicious symptoms in subtertian malaria and it favours transmission by allowing the development of the carrier state. BANERJEA (p 791) contributes a note on the manufacture and retail sale of quinine tablets in the rural areas of the United Provinces.

ROBERTSON (p 792) refers to the problem of the protection of labourers engaged in the construction of the China Burma road which traverses highly malarious districts. Immediate measures include the provision of nets and screened quarters insecticidal sprays and quinine prophylaxis. permanent measures are directed to the indigenous population and the protection of labour gangs. WILSON and WILSON (p 792) describe the measures taken to reduce the breeding of *A. gambiae* in a highly malarious group of coffee estates in Tanganyika Territory. CORRADETTI (p 793) describes the antimalarial measures in force at the aviation camp of Combolcia where *A. gambiae* is the vector.

Malaria of Birds and Monkeys—TADDIA and VIERO (p 783) note that infection with malaria brings about hypertrophy of the reticulo-endothelial system. This supports the view that the occurrence of exoerythrocytic schizonts is the result of the presence of greater numbers of phagocytes and is therefore in the nature of an accident. CORRADETTI (p 783) states that different species of bird malaria

parasites vary in the extent to which exoerythrocytic development takes place. He regards these parasites as having originated from coccidia and as being adapted in various degrees to development in the blood. DE RUIT (p. 794) discusses exoerythrocytic schizonts in *P. gallinaceum* infection of fowls.

MARWELL and GOLDSTEIN (p. 794) have produced passive immunity in birds by injecting the serum of canaries hyperimmunized against *P. calhemeron*.

RODHAIN and LASSMAN (p. 794) show that *P. actidis* resembles the human *P. triax* not only morphologically but also in its preference for reticulocytes rather than mature erythrocytes.

RODHAIN and VAN HOOFF (p. 795) discuss the behaviour of the plasmodia of monkeys in various mosquitoes.

FULTON (p. 795) shows that the aromatic amidines have a definite action against *P. knowlesi* and inhibit oxygen uptake. Against *P. vivax* of birds one preparation was inactive but the other showed some activity.

C IV

BAIRAS (F. E.) Malaria in Southern Abra.—*Monthly Bull. Bureau of Health Manila* 1939 Oct Vol 19 No 10 pp 393-403. With 7 figs.

Abra is in Northern Luzon, Philippine Islands. For the greater part it consists of rocky mountains and hills. The population of Southern Abra is composed mainly of Tinglians, a primitive people now being christianized, and a lesser number of Ilocano settlers. Malaria was apparently very mildly endemic until November 1938 when a severe epidemic lasting three to four months, was experienced. The author made a short reconnaissance of the malaria situation in February 1939 when the epidemic was on the wane. He records his observations on spleen and parasite rates and on mosquito larvae collected. The causes of the epidemic remain obscure. There was an extension of irrigation in 1938 for the purpose of obtaining two crops of rice a year but there were places in which irrigation ditches were completely dry during the summer and which suffered as severely as any other. The author's observations did not reveal any marked prevalence of *A. flemingii* the supposed vector. Control measures will be more than usually difficult in Southern Abra in which easy means of communication are non-existent, and travel is impossible in the rainy season. Road construction is an essential preliminary to public health work. Dispensaries should be established to take care of the sick.

Norman White

RUSSELL (P. F.) SWEET (W. C.) & MAXON (M. K.) Some Observations on Malaria Parasite Rates in Infants in South India.—*Jl. Malaria Inst. of India* 1939 Dec Vol. 2 No 4 pp 430-455 With 1 chart.

Observations were made in two contrasting areas, (1) three communities in Mysore where malaria transmission may take place throughout the year and where malaria has been long prevalent, and (2) Pattukkottai Taluk in the Madras Presidency where the malaria season is determined by the irrigation season and where malaria is of recent introduction, 1933. In the Mysore area infant malaria rates were lower than the rates in children. The youngest infant found infected was six months old. There was no evidence that any month

was unfavourable for transmission though the most favourable period appeared to be October to March. The species of parasites found in infants were *P. vivax* 40 *P. falciparum* 33 and *P. malariae* 27 per cent. Gametocytes were found in 46.7 per cent of the positive infant smears. *P. falciparum* transmission may occur mainly in the cooler season *P. malariae* transmission mainly in the hot season.

In the Pattukkottai Taluk 1087 infants were examined during four surveys. The parasite rate of these infants was 6.2 per cent. No infant in the first month of life was found infected. Several infants two months old were infected. There was no evidence of general immunity in infants from 2 to 5 months old. The transmission season extended from July to January. *P. falciparum* infections formed three-quarters of the total infant infections the remainder being due to *P. vivax*. N IV

YOUNG (Martin D.) STUBBS (Travick H.) & COATNEY (G. Robert). Studies on Induced Quartan Malaria in Negro Paretics. I. Periodic Phenomena of the Asexual Cycle.—*Amer. J. Hyg.* 1940 Mar Vol. 31 No 2 Sect. C. pp 51-59. With 3 figs.

The observations recorded were made on four Negro patients infected by direct intravenous inoculation of 5 cc. of whole blood containing parasites of a strain of *P. malariae* that has been employed since 1932 for malaria therapy. The strain regularly produces infection with 20 to 40 paroxysms and it seldom breaks up into more than one brood of parasites. Incubation periods vary from 10 days to one month or more. In these four patients smears were made every six hours during the course of infection. On the day of the paroxysm and on the day preceding it smears were made more frequently often at hourly intervals. Rectal temperatures were recorded four hourly when the temperature exceeded 100° F. the temperature was recorded every hour. In examining the films usually 100 parasites were counted. They were recorded as rings forms less than half the size of the red cell and larger forms. The older parasites were recorded according to the number of chromatin masses they contained, which varied from 2 to 12. These 14 stages formed 3 groups: trophozoites with single chromatin masses, young schizonts with from 2 to 5 chromatin masses and segmenters with 6 or more chromatin masses. Altogether more than 30 000 parasites were recorded.

The strain of *P. malariae* studied possesses a high degree of synchronicity. The asexual cycle was repeated every 72 hours. The duration of the growth stages was trophozoite 54.2 hours, young schizonts 10.4 hours and segmenters 7.4 hours. The process of segmentation lasted about six hours. The rise of temperature closely followed the progress of segmentation. It reached its height at the end of this process. N IV

BUONOMINI (Giulio). Nuove acquisizioni sullo sviluppo dei parassiti malarici. [Development of Malarial Parasites.]—*Settimana Med.* Palermo (formerly *Riv. Sanitaria Siciliana*) 1940 Mar 9 Vol. 28, No 10 pp 239-40 243-6. With 8 figs. on 1 plate. [17 refs.]

This is a review of recently acquired knowledge on the subject of schizogony of malarial parasites with special reference to the development and function of the exoerythrocytic schizonts. The paper appears to describe no new observations. C M Wemyss

VARGAS (A.) & FREIRE (F.) Novos processos para avaliar a área de vôos dos anofeles. [New Methods of measuring the Range of Flight of Anopheles.]—*Ann. Paulista Med. e Cirurg.* 1940 Jan. Vol. 39 No 1 pp. 3-7

The authors have carried out experiments with a method described by WEATHERS and HASSELL (see this Bulletin 1939 Vol. 36 p. 137) Mosquito larvae are placed in dilute stains the dye persists into the adult stage. They found that an immersion of the larvae in a solution of methylene blue from $\frac{1}{4}$ to $\frac{1}{2}$ per mille for from 18 to 48 hours, is sufficient to colour the thorax and abdomen of the adult mosquitoes developing therefrom. They found that some anopheline larvae can live for days in a $\frac{1}{4}$ per 1000 solution of methylene blue thereafter completing their development into coloured adults. This observation prompted an attempt at dispersal of the *Anopheles* emerging therefrom by measuring the range of dispersal of the *Anopheles* emerging therefrom. On one or two occasions it was possible by this means to obtain recognizably coloured *Aedes* and *Culex*, but *A. argyritarsis* and *A. larimaculatus* showed no evident stain. Thereafter anopheline larvae were kept for 48 hours in a solution of methylene blue in the laboratory and then returned to their original breeding places. This method was successful. A W

CAMBOURNAC (F. J. C.) & HILL (R. B.) The Biology of *Anopheles maculipennis* var. *atroparvus* in Portugal.—*Acta Comp. (et) Mal. Rec. Applied Entom.* 1939 Vol. 2 pp. 178-184 [Summarized in 117-119] July 1940 Vol. 28 Pt. 7 pp.

In Portugal, *Anopheles maculipennis* Mg. race *atroparvus* van Thiel, is responsible for the transmission of hyperendemic malaria in some areas and for sporadic outbreaks in others, whereas it is present in still other areas where malaria is unknown. For this reason, special attention has been paid to its biology under different conditions, and in this paper are summarized the results of observations over a period of 5 years, with special reference to the hyperendemic area of Agua de Moura.

Although appreciable variations in the morphology of the egg occur in the same locality, and even in the same batch of eggs, the pattern and type of float are essentially those described by van Thiel and other authors for this race. The length and width of the egg, length of float and relation of float length to egg-length vary considerably in the same batch. In one batch from a female caught in nature the float-length varied from 19 to 41 per cent of the total egg-length and in another from 22 to 45 per cent. On the average the float length is about 34 per cent and in most batches the variation is approximately 10 per cent. The larval and adult characters are similar to those described by other authors but again considerable variations were found in each of the characters commonly used for classification.

The larvae develop in practically all clean waters with a negative bio-chemical oxygen demand and a pH between 6 and 8 provided that there is sunlight some vegetation and little or no current. Such waters include swamps, canals, irrigation and drainage ditches and other semi-permanent collections of water especially rice-fields. In rice-fields, the concentration of larvae is greater than elsewhere.

and on account of their extent they produce at least 90 per cent of all Anophelines in Portugal. They are flooded from May to September and so constitute a source of adults throughout the malaria season. The larvae can withstand and may even be favoured by relatively high temperatures. Three years observations have shown that the temperature of the water in rice fields at 4 o'clock in summer varies from 24 to 32°C [75.2 to 89.6°F] with means of 27.29 and 28°C [80.6, 84.2 and 78.8°F] for June, July and August respectively. Though breeding is prolific near tide water where many rice-fields are situated it occurs only in fresh water. The larvae are found in water with a total chloride content of between 50 and 130 mg per litre. When the salinity rises they are replaced by larvae of the genus *Aedes* but they appear again when the salinity is reduced to 170 mg. Under laboratory conditions adults may be obtained from larvae reared in water containing up to 0.8 per cent sodium chloride but the larval mortality is high and development is prolonged.

At room temperatures in the spring and summer about 80 per cent of the gravid females caught in nature will oviposit in small vials. The percentage diminishes in September and is only about 3 during November-January. It rises suddenly to 70 about the middle of February. In nature, a few scattered eggs and larvae are found in January but they do not appear in any numbers until the middle of February. The first males appear at the beginning of March and the last ones die in December. In the relatively mild climate in which the temperature falls to 0°C [32°F] only for short periods the females do not usually hibernate. During September fat begins to develop and oviposition is suspended in October when approximately 4 per cent of the females contain both fat and partly-developed eggs in which further growth is suspended. Females taking refuge in well-built and relatively warm inhabited stables and rabbit hutches increase in numbers until January. They are not found in houses or attics during the autumn and winter or even in spring until the new generations appear. During relatively warm winter days feeding takes place and movement into the open occurs. In two rabbit pens where all the Anophelines were caught each week for three years the population was renewed each week in both winter and summer. Females caught in nature about the middle of October or bred in the laboratory (the latter either infected with *Plasmodium* or not) survived the winter in small cages whether unfed or given a weekly blood meal. Most of them died off suddenly towards the end of January but a few survived until the last week in May. In nature there is also a sudden falling off in the numbers in shelters at the end of January but many survive and those captured live as long as those kept in cages through the winter. Overwintered females after taking a blood meal in spring laid from 2 to 4 batches of viable eggs.

In spring the life-cycle from egg to adult lasts about 30 days but in summer the average is 18 days. 6-7 generations occur in a year. In rice-fields the number of larvae increases up to June when the average number per square metre was 400. This number falls to 100 in July and 70 in August. A similar decrease occurred in the numbers of adults caught as the summer advanced. The length of life of the adult whether infected or uninfected varied from 7 months in winter to about 2 months in summer. The adults are extremely resistant to high temperatures. Their preferred shelters are sheds containing animals but if they are very abundant they invade all shelters and

In this way some find their way into houses. They feed under cover or near shelters, but never in the open. repeated attempts to catch females with human or animal bait in the open fields or in the vicinity of rice-fields invariably failed. The flight range of the female when hungry is at least 3 kilometres, but after feeding it can fly with difficulty only a few yards. Most females do not necessarily feed only at night and in subdued light will attack man and animals at any time of the day. Although the blood of rabbits, horses and pigs in that order is preferred, all the usual domestic animals and man are attacked when hosts are relatively scarce. The tendency of this *Anopheles* to take any available food, together with the chance selection of houses for shelter would appear to be largely responsible for the continuance of hyper endemic malaria. When its density is high, malaria is endemic; when its density is low the small numbers attacking man make it an inefficient vector. Thus its capacity as a vector depends largely on its abundance.

WEYER (Fr.) Zur Frage der Konstanz in der Zusammensetzung natürlicher Populationen von *Anopheles maculipennis* (Constancy in the Racial Composition of *A. maculipennis* Populations).—*Ztschr. f. Parasitenk.* 1939 Dec. 21 Vol. 11 No 2 & 3. pp 357-370.

In the course of eight years, in numerous localities in North Germany no fundamental change has been detected in the races which compose the population of *A. maculipennis*.

Since the various races of *A. maculipennis* are now well recognised entities differing in their relation to malaria, it is important to know in a given locality whether the composition of the population is remaining constant or whether one race is increasing at the expense of the others. The races differ from one another in their choice of host and of resting place and in the case with which they are obtained at different seasons of the year. They may be differently affected by abnormal drought or flooding etc. Great care is therefore necessary if the observer is not to be misled. As already stated in the course of observations extending in some places over 8 years, in which these sources of error were taken into account, no change could be detected in a series of localities in North Germany.

WISSEMAN (R H) SYMES (C B) McILHARROW (J C) & TERADALE (C.) Report on a Malaria Survey of Mombasa.—80 pp. With 3 plates, 1 folding plan & 3 figs. 1939 Nairobi [Summarized in *Re. Applied Entom.* Ser B 1940 July Vol 28 Pt 7 pp. 114-118.]

Although the incidence of malaria at Mombasa has decreased appreciably during recent years, cases still occur occasionally in some numbers. A detailed account is given of malaria and mosquito surveys carried out from May 1936 to May 1937 as a preliminary to evolving a comprehensive scheme for dealing with the problem of this residual malaria. Information was also collected during the mosquito survey on the prevalence of *Aedes aegypti* L. in connection with the possible introduction of yellow fever particularly since Mombasa has been made a port of call for the Imperial Airways Flying Boat Service between Europe and South Africa.

The clinical survey indicated that the incidence of malaria is high—the high spleen and parasite rates and the fact that they were higher in children than in adults indicated an acute exacerbation of an endemic situation. On the island the incidence is greatest in the two main African areas—on the mainland the general incidence is very high. The monthly incidence shows a peak period in May–August following the long rains and a smaller secondary wave in December and January following the short rains.

The work on mosquitos included searches for breeding places in land not included in house compounds ('outside breeding places') in houses and their compounds in wells and in tree holes—searches for adults in and around houses and in bush and other natural harbourages out of doors—a staining experiment to ascertain whether it was possible for the island to be invaded by adults from the mainland—a small number of dissections to determine the rate of infectivity—and examination of mail trains arriving at Mombasa to determine the part they play in introducing mosquitos.

The 61 species of mosquitos recorded included 7 Anophelines. *Aedes aegypti* was by far the most prevalent species in Mombasa—the larvae occurred in 33 per cent. of the outside breeding places 9 per cent. of those in houses or compounds on the island and 19 per cent. of similar ones on the mainland, and were also obtained from trees banana and pineapple plants and occasionally wells. Larvae of *Anopheles gambiae* Giles occurred in 1.6 per cent. of the outside breeding places on the island and in 11 per cent. of those on the mainland. They were found on 12 occasions in artificial containers and in 1.4 per cent. of the wells searched. The adults occurred in nearly 6 per cent. of the houses visited on the mainland but were rare in those on the island—considerable numbers were brought into the town by train. The infectivity rate for the year was 3.1 per cent. Small numbers of larvae of *A. funestus* Giles were found in natural waters and in wells on the mainland and a few adults in houses—it is assumed however that the population of this species is much larger than is suggested by the numbers collected. *A. gambiae* and *A. funestus* which were the only Anophelines present in houses are undoubtedly the vectors of malaria in Mombasa—the former being responsible for all the cases on the island and for most of those on the mainland. *Culex fatigans* Wied. was the commonest mosquito in houses—it bred in a variety of water containers and most abundantly in pit latrines—it is known to be a carrier of *Filaria (Wuchereria) bancrofti* elsewhere and as this disease occurs both up and down the coast there is little reason to doubt that it is a vector in Mombasa.

Of the species of mosquitos that have been shown experimentally to transmit yellow fever or to harbour the virus *Aedes simpsoni* Theo *A. villatus* Big *Eretmapodites chrysogaster* Graham *Mansonia (Tanniorhynchus) africanus* Theo *M. (T.) uniformis* Theo and *Culex thalassius* Theo have been taken in Mombasa. If a mosquito infected with yellow fever were brought to Mombasa with its dense population of susceptible persons and its abundant vectors there would not only be a major catastrophe but the damage to the country's sea trade would be almost irreparable. The coastal districts would almost certainly become endemic areas since monkeys which may act as reservoirs, are present and possible vectors are plentiful. It is believed that the measure most likely to afford protection from yellow fever is the eradication of mosquitos in and near airports. The fact

that *A. aegypti* is also a vector of dengue which occurs in neighbouring countries, is regarded as an additional reason for its control.

Recommendations are made for eliminating the breeding places of the actually or potentially dangerous mosquitos, and it is suggested that measures should be taken for the destruction of adults in trains and aircraft. In addition to such usual operations as filling and draining, oiling and dusting with Paris green, the recommendations include the filling of rot-holes in trees, preventing the accumulation of water in the steps cut in the trunks of coconut palms by cutting V-shaped drainage channels in them, the provision of mosquito-proof covers for wells, and the periodic clearing of vegetation to facilitate the removal of all water-holding refuse. Experiments with stained mosquitos showed that *A. aegypti* and certain other mosquitos can reach the island from the mainland, and there is no reason to suppose that *A. gambiae* which is a strong flyer cannot do so too."

ADAMS (P. C. G.) Some Observations on the Flight of Stained Anophelines at N'kana, Northern Rhodesia.—*Amer Trop Med & Parasit* 1940 Apr 30 Vol. 34 No. 1 pp. 35-43 With 1 sketch map

N'kana is a copper-mining township in Northern Rhodesia. Despite efficient anti-larval measures carried out over a radius of half a mile from the edge of the inhabited area adult anophelines were constantly found in the native huts in the control area. The author has shown that the source of many of these anophelines is the Kafue River three miles eastward—the winds prevail from the river across N'kana. Such considerations prompted the observations on the flight of stained mosquitos reported. *A. funestus* can travel as far as 4.5 miles down wind, the same distance at an angle of 45° to wind, 1.5 miles at an angle of 30° up-wind, and 1.8 miles at right-angles to wind. *A. gambiae* can travel 4.25 miles down wind, and 1.50 miles at a right-angle to wind. The method of combating dangers arising from such prolonged flights is either the removal of the source of infection from proximity to the production area, or adult-control at the source of infection, and in larval controlled areas. [See also this *Bulletin* 1940 Vol 37 p 287] A 11'

HINMAN (E. Harold) & HURLBUT (H. S.) A Study of Winter Activities and Hibernation of *Anopheles quadrimaculatus* in the Tennessee Valley.—*Amer J Trop Med.* 1940 May Vol. 20 No. 3 pp. 431-446. With 2 plates. [10 refs.]

In the Tennessee Valley, *A. quadrimaculatus* passes the winter solely as a hibernating female after insemination. Fat is stored in the autumn and gradually used up during the winter hibernation lasting from late November to early February. If such females are exposed to temperatures above 68°F blood meals are taken and ovarian development is resumed. Oöcyts were discovered in one specimen found in a cave in early December. V B Wigglesworth.

HINMAN (E. Harold) & HURLBUT (Herbert S.) The Relation of Shade to *Anopheles quadrimaculatus* Breeding—a Preliminary Report.—*Jl Parasitology* 1940 Apr Vol. 26. No. 2. pp. 145-156 With 3 figs

Shading the breeding places seems to have little effect on *Anopheles quadrimaculatus*.

Several species of *Anopheles* can be effectively controlled by shading their breeding places notably the stream breeder *A. minimus* in Assam and the sunlight loving species *A. gambiae* in Africa. The authors have therefore studied the effect of shade on the breeding of *A. quadrimaculatus* in certain reservoirs in the Tennessee Valley. Two species of aquatic trees native to the area have been planted round several reservoirs, but their effect will not be known for many years. Comparison in different localities showed that the intensity of breeding was less in densely shaded waters but it was never entirely prevented. Artificial shade established by supporting a tarpaulin over a natural breeding place reduced the number of larvae present but failed to eliminate them. In the laboratory *A. quadrimaculatus* has been reared in complete darkness. It appears therefore that shading is not likely to be entirely effective against this species.

V. B. Wigglesworth

VARGAS (Luis). Clave para identificar las larvas de Anopheles Mexicanos [Key to the Larvae of Mexican Anopheles].—Reprinted from *Ciencia*, 1940 Apr 1 Vol 1 No 2 pp 66-68

DEL PONTE (Eduardo). Observaciones sobre *Anopheles pseudopunctipennis* en la Mendieta. [1 *pseudopunctipennis* in La Mendieta].—*Bolet Sanitario Buenos Aires* 1939 Sept. Vol 3 No 9 pp 571-577

BLACK (J. B.) The Accidental Transmission of Malaria through Intravenous Injections of Neocarsphenamine.—*Amer J Hyg* 1940 Mar Vol 31 No 2 Sect C pp 37-42. [25 refs.]

There was an unduly high proportion of malaria infections among patients attending a syphilis clinic in the out-patient department of a hospital in Rutherford County, Tennessee. Investigation showed that infection was being transmitted by the method used in giving intravenous neocarsphenamine injections. A glass percolator and rubber tubing into the distal end of which a needle was inserted were used. A small piece of glass tubing near the insertion of the needle formed a window. A fresh needle was used for each patient but after the needle had been inserted into the vein blood was allowed to flow back to the window to ensure that the point of the needle was in the lumen of the vein. The drug was then injected by gravity. There was thus a possibility of the injection being contaminated with blood adhering to the inside of the glass tubing. Since the method was replaced by the use of a fresh sterile syringe for each patient the undue prevalence of malaria among patients attending the clinic has been entirely eliminated. [An almost exactly similar occurrence was reported by WENYON in 1926 (*Protozoology* p 955)] A H

CHUNG (Hueilan) LIU (W. T.) WANG (C. W.) & CHU (Irving). Transmission of Malaria among Drug Addicts in Peking. Demonstration of Malarial Parasites in Syringes used for Intravenous Injections of Heroin.—*Chinese Med J* 1940 Jan Vol 57 No 1 pp 32-38. With 8 figs. on 3 plates. [15 refs.]

The authors report cases of malaria among heroin addicts. They describe the method employed in three heroin dens in giving intravenous injections of the narcotic to the unfortunate victims, a method devoid

of any antiseptic or aseptic precaution. Confirmation of the *prima facie* assumption that infection of malaria, and of other diseases, might be transmitted through the common use of hypodermic syringes and needles was afforded by finding crescents and ring forms of *P. falciparum* and gametocytes of *P. vivax* in the residual fluid in syringes used in two heroin dens.

N IV

SCHILLING (Claus) Immunizzazione contro la malaria. [Immunization against Malaria.]—*Rendiconti Istituto di Sanità Pubblica* Rome. 1939 Vol. 2. Pt. 3 pp 655-672. [20 refs.]

This is an amplification of the author's work summarized in this *Bulletin* 1940 Vol 37 pp 368-367. A detailed description is given of the methods adopted in giving schizont and sporozoite inoculations. The author concludes that adult man has a natural resistance against a minimal number of both schizonts and sporozoites of the Madagascar strain of *P. vivax*. The subcutaneous inoculation of increasing doses of schizonts can confer a high degree of resistance against schizonts: a dose as high as 80 000 schizonts may be resisted. Man is much more sensitive to the subcutaneous inoculation of sporozoites than of schizonts. The value of sporozoites as antigen is uncertain and is much influenced by individual reaction: the resistance of one patient was much increased by sporozoite inoculations. An immunity against the bites of infective mosquitoes was conferred in one case by a series of inoculations first with schizonts and later with sporozoites. In two cases after the spontaneous recovery of primary attacks sufficient resistance developed to protect against infective mosquito bites: such resistance can be further increased by sporozoite inoculations.

N B

CANNATA (Roberto) Malaria latente rivelatasi nel decorso di malattie infettive acute. [Latent Malaria Infections Activated during the Course of Acute Infectious Diseases.]—*Pediatrics* 1940 Feb Vol 48 No 2 pp 113-116

Two cases are described, one of typhoid fever and the other of meningococcal cerebrospinal meningitis, during the course of which unsuspected malaria infections became active.

N IV

LERICHE (E.) Manifestations buccales au cours d'accès palustres. [Buccal Complications of Malaria.]—*Rev. Méd. Française d'Extrême Orient* 1939 Nov No 9 pp 1169-1172. Also in *Rev. du Paludisme et de Méd. Trop.* Paris 1940 Apr 15 Vol. 2 No 10 pp 110-113.

The author calls attention to the occurrence of gingivostomatitis complicating acute attacks of malaria. Most of such cases are responsive to local treatment but there are others in which the local condition remains refractory until the general condition is ameliorated by specific malaria treatment. Two such cases are described. Should

the stomatitis assume a haemorrhagic form an avitaminosis C should be suspected lessened resistance caused by malaria may contribute to a manifestation of signs of such deficiency N IV

CASQUEIRO (Antonio) Post partum e paludismo [Malaria and Pregnancy].—*Africa Méd* Lisbon 1940 Feb Vol. 6 No 2 pp 33-38.

The author reports that post-partum retraction of the uterus may be much delayed in malarial subjects. He describes several cases of such delayed retraction with the haemorrhage and other symptoms to which the condition may give rise. The administration of anti malarial remedies rapidly rectifies the condition. The importance of prompt recognition of the malaria infection is stressed N IV

CRAIG (Charles F) The "Short-Term" Treatment of Malarial Infections with Quinine.—*Amer J Trop Med* 1940 Mar Vol. 20 No 2. pp 239-248 [16 refs.]

This is a very energetic protest against the adoption of the short term treatment of malaria with quinine. The author maintains that there is no adequate evidence that it results in either an efficient premunition or an immunity. It is dangerous inasmuch as it does not prevent the development of pernicious symptoms in *P. falciparum* infections. It favours transmission through favouring the development of carriers and thus perpetuates infections. The aim of the physician in the treatment of malaria with quinine should be to eliminate infection. the vast majority of malarial infections can be eliminated by the administration of quinine in adequate doses for a considerable length of time N II

BANERJEE (A. C.) Note on the Manufacture and Retail Sale of Quinine Tablets in the Rural Areas of the United Provinces.—*J Malaria Inst of India* 1939 Dec. Vol. 2. No 4 pp 377-386 With 8 figs. on 4 plates & 1 map

The practical importance of and the difficulties attendant on making quinine available to the rural populations of malaria-stricken countries endow this paper with interest. It describes the procedure now in force in the United Provinces where the annual sales of quinine during the last six years have increased from 500 to 5 000 lb. The installation of modern power-driven machinery has resulted in a reduction in the cost of the conversion of quinine powder into tablets from Rs. 12 to Rs. 4 per lb. It has also enabled a standardization of the alkaloid content of the tablets. One anna grease paper packets each containing 5 tablets of three grains can be bought at about 2,500 post offices or from rural postmen who visit even the remotest villages. The selling agent makes a profit of 10 annas on each box of packets for which he pays Rs. 5. Attempts are being made to enlarge the selling agency N IV

VANBELLOW (Joachim Dieter) Ueber die Bedeutung des Atebrins für die Malariaabehandlung und vorbeugung [The Value of Atebrin in the Treatment and Prophylaxis of Malaria].—*Arch f Schiffs u Trop Hyg* 1940 May Vol. 44 No. 6 pp. 199-221 [3 pages of refs.]

ROBERTSON (R. Cecil) Malaria in Western Yunnan with Reference to the China Burma Highway.—*Chinese Med. J.* 1940 Jan. Vol. 57 No. 1 pp 57-73 With 1 map

The new motor highway from Kunming (Yunnanfu) to Lashio in the Northern Shan State was constructed with great rapidity. It traverses country which has for long had an unenviable reputation for malaria and malaria caused havoc among the labour forces constructing the western section of the road. This report contains interesting, though necessarily incomplete information concerning malaria conditions along the western end of the highway. Its publication serves to direct attention to precautions and measures which should be taken without delay. The author set up a malaria survey laboratory at Mangwhih which is situated in a small agricultural plain about 3 600 feet above sea level and surrounded by mountains. Fourteen species of *Anopheles* were found of which six were shown by dissection to be malaria vectors, *minimus maculatus jayporiensis*, *calicifacies*, *kytarsus* var *sincensis* and *annularis*. *A. minimus* appears to be the most dangerous vector.

The immediate control measures advocated include the provision of mosquito nets for transport workers, the construction of screened hostels at the vehicle parking places, insecticidal sprays for vehicles in which drivers have to sleep and quinine prophylaxis. More permanent measures should include health education of the indigenous population, attempts to deparasitize the local Shan population along the western section of the road, medical aid for labour forces, mosquito-proof shelters for labour gangs, placing screened depots of the transport system on suitable sites away from swamps, the provision of mosquito nets of a mesh sufficiently small to exclude *A. minimus* and the improvement of medical and hospital facilities. N IV

WILSON (D. Bagster) & WILSON (Margaret E.) Control of *A. gambiae* on Coffee Estates.—*East African Med. J.* 1940 Feb Vol. 18 No. 11 pp 405-415 With 2 figs. (1 map)

A group of coffee estates on the slopes of Mount Meru in the Northern Province of Tanganyika Territory with a population of about 4 150 of which 50 are Europeans has suffered much from seasonal malaria. Very little money is available for antimalaria measures. A great variety of anopheline breeding occurs but with very rare exceptions *A. gambiae* is the only species found inside houses. Formerly malaria transmission took place during eight months of the year. Over a period of two years anti-larval measures have been undertaken. Oiling has been applied to known or probable *A. gambiae* breeding places. This was applied as far as possible by means of sawdust soaked in oil and scattered by hand. Where this method was not practicable pressure sprayers were used. Borrow pits and pools which were too large to be cheaply filled were packed with cut vegetation. Many earth drains have been dug. The total cost of these control measures was about £12 per square mile. Oiling was commenced immediately following the first finding of adult mosquitoes. The period of oiling and its effectiveness, were determined by the results of anopheline catches in fixed catching stations. The effect of these measures has been to free the area from malaria transmission for 8-9 months as compared with 4 months

in the past. Anopheline infestation during the transmission season is only a sixth of its previous level. Anopheline infectivity has been reduced from 4.6 to 3.6 per cent

N W

CORRADETTI (Augusto) Programme de lutte antipalustre au camp d'aviation de Combolcia pour 1939 Conditions paludéologiques de la plaine de Combolcia [Anti-Malaria Measures in Combolcia Aviation Camp during 1939 Malaria Conditions in the Combolcia Plain.]—*Bull. Office Internat. d'Hyg. Publique* 1940 May-June Vol. 32 No 5-6 pp 560-563 With 1 fig

The malaria season in Combolcia is from September to December. This is the rainy season. *A. gambiae* is the vector. The soil is very slightly permeable, consequently during the rains puddles are innumerable and the whole plain becomes in effect a mosquito-breeding marsh. Airplane dusting with Paris green is the antilarval measure employed over an area of 3 kilometres from the aerodrome. The hopper used for the discharge of the dust from the plane is described and figured. Dusting was carried out once a week from the beginning of August to the end of December. In addition, attention is given to the mosquito-proofing of dwellings, the use of mosquito nets, the destruction of adult mosquitoes with Flit and the administration of prophylactic quinine

N II

BECKMAN (Harry) The Prophylaxis of Malaria.—*Southern Med J* 1940 May Vol. 33 No 5 pp 518-522. With 1 fig [24 refs.]

TADDIA (Leo) & VIERO (Giovanni) Ricerche sulle fasi exoeritrocitiche del *Plasmodium relictum* [Exoerythrocytic Phases of *P. relictum*].—*Riv. di Parassit.* Rome 1940 Mar Vol. 4 No 1 pp 45-49 With 1 fig [19 refs.]

The authors have found exoerythrocytic schizonts in birds captured in Venice and found to be infected with *Plasmodium relictum*. Blood from these birds inoculated to canaries produced the same infection associated also with exoerythrocytic schizonts. It was noted that the malarial infection brought about a hypertrophy of the reticulo-endothelial system, a fact which lends support to the view that the occurrence of the exoerythrocytic schizonts is the result of the presence in the body of greater numbers of phagocytic cells and is thus in the nature of an accident. The authors favour the view that these schizonts do not represent an essential stage in the life cycle of the parasite

C M Wemyss

CORRADETTI (Augusto) The Significance of the Exo-Erythrocytic Cycle of *Plasmodia*.—Translation of a Lecture read at the University of Rome on January 25th 1940 8 pp [27 refs.]

— The Significance of the Exo-Erythrocytic Cycle of *Plasmodia*.—*Jl Trop. Med. & Hyg.* 1940 Apr 15 Vol. 43 No 8 pp 110-113 [27 refs.]

Discussing the exoerythrocytic development of certain bird malarial parasites the author points out that species differ in the degree to

which this development takes place. Thus in species of *Haemoproteus* the schizogony occurs exclusively in cells other than red cells. In *Plasmodium elongatum* most of the development is exoerythrocytic but some schizogony occurs in the red cells, while in many species as far as is known, the schizogony is exclusively erythrocytic. These blood protozoa are regarded as having originated from coccidia, in which schizogony never occurs in red blood corpuscles and the varying degree in which erythrocytic schizogony replaces exoerythrocytic schizogony reveals a varying adaptation of coccidia to development in the blood

C M IV

DE RITIS (Ferdinando) Sul decorso dell'infezione da *P. gallinaceum* Brumpt, 1935 [Course of *P. gallinaceum* Infection.]—*Riv di Parasit.* Rome 1940 Mar Vol 4 No 1 pp. 61-68.

In a study of *Plasmodium gallinaceum* of fowls the author finds that the incubation period is shortest after intravenous inoculation and longest after subcutaneous inoculation while intramuscular inoculation holds second place. The exoerythrocytic schizonts were constantly present in fowls dying during the fourth or fifth week of infection and their presence was uninfluenced by the administration of quinine given from the time of the appearance of parasites in the blood. These schizonts were not present in fowls dying after five weeks but the blood of such fowls inoculated to fresh birds gave rise again to infections associated with them.

C M II

MAXWELL (Reginald D.) & GOLDSTEIN (Frederick) Passive Immunity in Avian Malaria.—*Jl. Experim. Med.* 1940, Mar 1 Vol 71 No. 3 pp 409-422. With 4 charts. [19 refs.]

By inoculating serum from canaries hyperimmunized against *Plasmodium cathemerium* the authors have been able to confer on healthy birds a passive immunity against the parasite. From the therapeutic point of view the serum is more effective when administered before infection has occurred than when given after. The protective substances whatever may be their nature are present in the serum in very low concentration but this can be raised by superinfecting the birds

C M IV

RODRAIX (J.) & LASSMAN (P.) Le comportement de *Plasmodium schretts* (Brumpt) du chimpanzé vis-à-vis des réticulocytes. [Behaviour of *P. schretts* of the Chimpanzee in regard to the Reticulocytes.]—*Ann. Soc. Belge de Méd. Trop.* 1940 Mar 31 Vol 20 No. 1 pp 83-90.

The authors have had the opportunity of studying a freshly isolated strain of *Plasmodium schretts* by inoculation into a chimpanzee of blood from a chimpanzee received in Antwerp in 1939 from the Belgian Congo. This strain differed somewhat from one previously studied and definitely revealed a preference of the young parasites for reticulocytes as against the mature erythrocytes. In this respect the parasite resembles the human *P. vivax* which it resembles so closely morphologically

C M IV

- RODHAIN (J) & VAN HOOFF (Th) Contribution à l'étude des *Plasmodium* des singes africains. Le comportement différent des *Pl. gonderi* et *Pl. kochi* chez les moustiques [The Plasmodia of African Monkeys. Different Behaviour of *P. gonderi* and *P. kochi* in Mosquitoes]—*Bull. Soc. Path. Exot.* 1940 Feb 14 Vol. 33 No 2 pp 107-113

The common malarial parasite *Plasmodium kochi* of Central African monkeys failed to develop in *Anopheles maculipennis* *Aedes aegypti* or *Culex pipiens*. On the other hand *Plasmodium gonderi* developed readily in *A. maculipennis* which transmitted infections to monkeys by its bites but it did not develop so readily as did a strain of *P. cynomolgi* which was tested at the same time in Antwerp

C M B

- FULTON (J D) The Course of *Plasmodium relatum* Infection in Canaries and the Treatment of Bird and Monkey Malaria with Synthetic Bases—*Ann. Trop. Med. & Parasit.* 1940 Apr 30 Vol. 34 No 1 pp 53-68. With 1 chart

It is shown in this paper that the aromatic amides (4,4-diamidino stilbene and 4,4-diamidino-1,5-diphenoxy pentane) given intravenously have definite action on *Plasmodium knowlesi* in that infections with this parasite in rhesus monkeys were rendered non-fatal. The action was similar to that of atebryn but somewhat slower. Relapse occurred in all but one of eight monkeys employed. In the case of bird malaria, the course of which is described in detail from observations on several hundred birds infected with *P. relatum* the stilbene derivative was inactive but the phenoxy pentane compound delayed the appearance of parasites for a considerable time. The same is the case with the aliphatic base 2-amino-5-diethylamino pentane, which corresponds to the side chain of plasmoquine. As regards the effect of oxygen uptake, both the drugs tested against monkey malaria had an inhibiting action when tested on the parasites *in vitro*. C M W

- MISSIROLI (Alberto) Metodi biologici di controllo dei medicinali antimalarici. [Biological Methods of testing Antimalarial Drugs.]—*Rendiconti Istituto di Sanità Pubblica* Rome 1939 Vol. 2, Pt. 3 pp 731-746. With 4 figs. & 2 coloured plates.

The paper describes the technique of testing antimalarial drugs and gives details of the methods of handling birds and monkeys for this purpose. In a coloured plate are illustrated *Plasmodium gallinaceum* toxoplasma like parasites including what are presumed to be its schizonts and other inclusion bodies in the cytoplasm of mononuclear cells of the fowl's blood. Another plate figures various stages of development of *P. knowlesi*. C M W

PELLAGRA

PRÉCIS OF ABSTRACTS IN THIS SECTION

AYEROYD and SWAMINATHAN (p 797) have estimated the nicotinic acid content of maize, rice and other cereals. The figure for maize is

low but the nicotinic acid content of a poor maize diet, associated with pellagra, is greater than that of a typical poor rice diet and in this respect therefore, the association of pellagra with maize is not explained. In parboiled rice the nicotinic acid from the germ and pericarp diffuses throughout the grain and cannot be removed on milling.

NAJJAR and WOOD (p. 798) have found a hitherto unrecognized nicotinic acid derivative in human urine. They give the technique used and suggest that its measurement may be valuable in states of deficiency.

WILLIAMS (p. 796) refers to the many skin conditions which arise from malnutrition and suggests that the name pellagra be reserved for those showing the classical condition. MOORE (p. 798) shows that the syndrome of sore mouth, skin and nervous manifestations is not due to vitamin B₁ deficiency and that the associated signs, especially dry scaly skin and retrobulbar neuritis, occur in places where there is no deficiency of vitamin A. The syndrome of sore mouth, affections of the skin of the genitals and elsewhere retrobulbar neuritis, and nervous symptoms should therefore be regarded as of pellagrous origin. MORRIS *et al.* (p. 799) report from China 40 cases of pellagra, in all of which symptoms of beriberi, and in some of which symptoms of deficiency in vitamin A, were also present. Many other patients in the hospital suffered from glossitis which responded to nicotinic acid.

PALLISTER (p. 800) reports a case of pellagra, with skin, mouth and genital lesions and loose stools, in a six-months-old baby in Malaya. A basal pulmonary abscess was also present and the child died.

The same author (p. 801) describes a syndrome found in Chinese in Malaya, which he regards as probably pellagra modified by other factors of diet or circumstances. There is ataxia with "stocking" anaesthesia and pain in the extremities, and the condition bears a close resemblance to the central neuritis of Jamaica described originally by SCOTT.

URABE (p. 802) sets down the symptoms of pellagra commonly seen in Korea. VAN BOGAERT and VAN DER BERGHE (p. 802) describe a case of pellagra in a woman in Belgium. Two patients are described by CAMPBELL and ALLISON (p. 803). In one the symptoms suggested a mixture of pellagra and beriberi, in the other they were fairly typical of pellagra. RAMAN (p. 803) details the results of blood examinations, gastric analysis and stool examinations of pellagrous patients in India. GOODALL (p. 804) describes the symptoms found in a number of patients in India, in whom treatment with nicotinic acid was very successful.

BARLOVATZ (p. 804) has found a high incidence of glossitis and angular stomatitis in miners of the Lower Congo. Nicotinic acid is useful in treatment but the best results were obtained from the administration of vitamin B₁. LEWY *et al.* (p. 806) show that certain neurasthenic symptoms of pellagra are not relieved by nicotinic acid amide though many are relieved by thiamin. They now show that cocarboxylase has an effect similar to that of thiamin. SMITH and MARTIN (p. 806) report four cases of cheilosis successfully treated with synthetic vitamin B₆.

GOLDSMITH *et al.* (p. 806) describe ascorbic acid tolerance tests used in the investigations of cases of pellagra. Deficiency in ascorbic acid is not uncommon in pellagra and clinical improvement is rapid on appropriate diet and 200-300 mgm. ascorbic acid daily. C II

AYEROYD (W R) & SWAMINATHAN (M) The Nicotinic-Acid Content of Cereals and Pellagra.—*Indian J Med Res* 1940 Jan Vol 27 No 3 pp 667-677 With 2 charts [11 refs.]

In view of the old commonly held idea that pellagra occurred endemically only among maize-eating (as opposed to rice eating) peoples and of the prominence recently accorded to nicotinic acid in relation to the disease the authors decided to estimate the nicotinic acid content of maize rice and other cereals. Using the cyanogen bromide method of Swaminathan values have been obtained for cereals in various states of preparation. The results were apparently contrary to what might have been expected and no explanation was found associating pellagra with maize consumption. It was further shown that this was true not only of Indian grown maize but also for maize grown in endemic areas of Rumania and the United States. The loss of nicotinic acid which occurs during preparation as food is interestingly brought out and the further point is made that the Rumanian pellagrous diet has a higher nicotinic acid content than that of non pellagrous Indians.

It is not possible to give the tables of figures published but the authors own conclusions may be quoted —

1 The nicotinic acid of a number of cereals and cereal products has been determined by the cyanogen bromide method. Whole wheat was found to stand the highest. Home-pounded raw and parboiled rice milled parboiled rice and barley came next in order. Maize milled raw rice and the various millets gave low value of a similar order.

2 Maize obtained from parts of the United States and Roumania, where pellagra is known to occur was found to have a nicotinic-acid content similar to that of Indian maize. Maize obtained from Roumanian families containing cases of pellagra did not give lower values than other samples.

3 The nicotinic acid present in rice is concentrated in the germ and pericarp. When rice is parboiled, nicotinic acid diffuses through the grain and cannot be removed on milling. Washing and cooking may remove some 50 per cent. of the nicotinic acid present in rice.

4 The nicotinic-acid content of a poor maize diet associated with pellagra and of a typical poor rice diet was compared. The latter was estimated to contain less nicotinic acid than the former. Comparison of the nicotinic acid content of poor rice and maize diets as determined by the cyanogen bromide method, thus fails to explain the association of pellagra and maize.

H S STANNUS

WASSMAN (Harry A) MICKELSEN (Olaf) MCKIBBIN (J M) & ELVENJEM (C. A) Nicotinic Acid Potency of Food Materials and Certain Chemical Compounds.—*J Nutrition* 1940 May 10 Vol 19 No 5 pp. 483-492. With 1 fig. [21 refs.]

KODICK (E.) Estimation of Nicotinic Acid in Animal Tissues, Blood and Certain Foodstuffs. 1. Method.—*Biochem. J* 1940 May Vol 34 No 5 pp 712-723 With 8 figs. [28 refs.]

KODICK (E.) Estimation of Nicotinic Acid in Animal Tissues, Blood and Certain Foodstuffs. 2. Applications.—*Biochem. J* 1940 May Vol 34 No 5 pp 724-735 [14 refs.]

NAJJAR (Victor A.) & WOOD (Robert W.) Presence of a hitherto Unrecognized Nicotinic Acid Derivative in Human Urine.—*Proc. Soc. Exptl. Biol. & Med.* 1940 June. Vol 44 No. 2 pp 398-399 With 2 figs.

"In the course of some studies on the excretion of thiamin in urine by means of the thiochrome method, using the procedure of Hennesey and Cerecedo (*J. Am. Chem. Soc.* 1939 Vol. 61 p. 179) it was noted that treatment of the HCl eluate of urine with alkali, even in the absence of ferricyanide yielded a small amount of a substance soluble in butyl alcohol which gave a bluish fluorescence with ultraviolet light. This fluorescence could be distinguished from that given by thiochrome even with the naked eye, being a whitish blue without any tinge of violet."

The substance was found to be excreted in promptly increased quantity after the ingestion of nicotinic acid. Examination of 27 different pyridine derivatives failed to identify any of them with this substance and spectroscopic examination indicated that it was not a porphyrin. It is probably an excretion product of nicotinic acid and its measurement may prove of value in states of nicotinic acid deficiency in man. Details of technique and of the daily output in normal persons are given. C II

WILLIAMS (Cecily D.) What is Pellagra in Children?—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940 June 27 Vol. 34 No. 1 pp 85-90 With 6 figs on 4 plates. [19 refs.]

In this article Miss Williams has set down her confession of faith or rather confession of want of faith in regard to pellagra in children. Reference is made to the conditions met with in children in various parts of the world (conditions which have been noticed in this *Bulletin* during the past few years) and to her difficulties in classifying them. She says —

"In conclusion I venture to suggest that many and various are the forms of malnutrition, and many and various are the skin conditions arising therefrom. There is nothing to prevent a mixture of nutritional diseases in the same individual, hence the appearance of many puzzling and indeterminate conditions."

Such a suggestion is not new but the further suggestion that —

The name pellagra had better be reserved for the classical condition while any other dermatitis which is suspected of a nutritional antecedent we might, as a compromise refer to as the Pellagroid of Procrustes."

will probably not meet with general approval. H S S

MOORE (D. Fitzgerald) Pellagra or Pellagra-like Conditions in Association with Deficiency of Vitamin A.—*Jl Trop. Med. & Hyg.* 1940 July 15 Vol. 43 No. 14 pp. 190-194 [58 refs.]

The author after alluding to the Colonial Advisory and Nutritional Diseases League of Nations Reports of 1937 states that much of the research which has been undertaken in the tropics has been of an individual nature and some findings expressed more as a personal view point than as collective evidence. Presented collectively therefore they may prove frankly conflicting. In the report referred to it is stated that other manifestations of vitamin A [deficiency] affecting the mouth and skin, have been noted in Ceylon and West Africa."

Dr Moore then proceeds to discuss the syndrome of sore-mouth and its associated signs—sore tongue and lips skin manifestations nervous symptoms, etc. To begin with there seems to be in more recent years a general consensus that they respond to autoclaved marmite (the PP factor) and are therefore not due to a vitamin B₁ deficiency

Of the associated signs some appear to be fairly constantly seen others less frequently found, or according to the reports by observers in certain countries always absent. A dry scaly skin has been described as due to a vitamin A deficiency but it occurs in pellagra [and scurvy] it is also a common manifestation in the condition described by the author in Nigeria where there is no lack of vitamin A

The affection of the skin of the scrotum so characteristically seen in pellagrins in America [and in Africa] is said by ELLINGER not to occur in Egypt It is however a part of the symptom-complex described by LANDOR and PALLISTER in the east in which other symptoms of pellagra are stated not to occur The follicular keratosis which may be noted in pellagra may also occur without signs of pellagra. It has been ascribed to a vitamin A deficiency and may be associated with accepted signs of that state. On the other hand the condition may be absent in cases exhibiting those signs. It may or may not be associated with sore tongue Defects of vision may also be seen accompanying sore tongue. The defective vision is commonly ascribed to a retrobulbar neuritis which in many cases is followed by optic atrophy. The condition may or may not be associated with keratomalacia and other signs of vitamin A deficiency some observers of course believe that vitamin A deficiency may occur with no ocular manifestations. That the visual defect is not due to a vitamin A deficiency seems proved by the observations of the author in Nigeria. In a valuable series of papers contributed over a number of years Dr Fitzgerald Moore has shown that the loss of central acuity of vision, due to a retrobulbar neuritis followed by partial atrophy occurs in a native population among whom there is no lack of vitamin A—this vitamin being amply provided by the red palm oil which forms a normal and valuable article of diet. In Nigeria xerophthalmia and keratomalacia do not occur but the visual symptoms referred to above are preceded or accompanied by sore tongue mouth and lips affections of the skin of the genitals and elsewhere together with nervous symptoms

In conclusion the author holds that the older belief in a vitamin A deficiency as the cause of this syndrome as stated in the League of Nations Report, must give place to an acceptance of their pellagrous origin.

H S S

MORRIS (H H.) HWANG (M S) & HUO (P T) Pellagra among the War Refugees in Shanghai Its Associated Deficiencies and Nicotinic Acid Treatment.—*Chinese Med J* 1940 May Vol. 57 No 5 pp 427-441 With 3 figs. [51 refs.]

References to pellagra in China do not appear to have been published before 1920 since when something under a dozen papers have appeared on the subject. Recently during ten months forty cases of pellagra have been admitted to the hospital for the Shanghai Refugee Camps where they had been living for a couple of years on an inadequate diet consisting of congee [?] and rice with small amounts of salted

vegetables at irregular intervals and salted meat and fish very occasionally.

All forty cases exhibited dermatitis and glossitis, with dementia in five cases, though the chief complaint on admission was of diarrhoea or oedema and in a few cases numbness of the extremities. On examination it was determined that all the forty had signs of beriberi. A fifth of the cases also had symptoms referred to by the authors as due to vitamin A deficiency—night blindness, xerophthalmia, keratomalacia, loss of sight and horny cutaneous eruptions—the ophthalmic and cutaneous manifestations not necessarily being present in the same cases [A fact worthy of note.] The oedema in these Chinese cases was of the nutritional oedema type associated with hypoproteinaemia. Several cases showed angular stomatitis. All showed low ascorbic acid blood levels but none signs of scurvy. In all hypo- or anacidity and some degree of microcytic hypochromic anaemia were demonstrated. By sternal puncture it was found that pro-myelocytes, pro-erythroblasts, pro-megaloblasts and megaloblasts were present in varying numbers and remained unchanged by treatment. There was no tendency towards a megalocytic hyperplasia.

Nicotinic acid proved curative for the glossitis, dermatitis and dementia. It was used in daily doses of 40–120 mgm parenterally for the sake of economy.

Almost more interesting than these cases of pellagra is the fact mentioned by the authors that 10–20 per cent of other patients in the wards of the hospital exhibited a glossitis which responded to nicotinic acid while in as many as 60 per cent complaint was made of abdominal discomfort, burning sensations in various parts of the body, vertigo, nervousness, palpitation, distractibility etc.

[No mention is made unfortunately of the total number of the refugee population whence these forty cases were drawn so that no idea of the incidence of the condition can be obtained. No mention is made one way or another of any affection of the skin of the scrotum and other points of interest receive no comment. In a paragraph headed "Associated with possible signs of riboflavin deficiency" reference is made to cracking at the angles of the mouth and erosion of the buccal mucous membrane which improved with treatment though at the same time it is stated that no riboflavin was available. It is not clear whether one should infer that the lesions responded to nicotinic acid.]

H S S

PALLISTER (R. A.) A Case of Infantile Pellagra in Malaya.—*Jl Malaya Branch Brit. Med. Assoc.* 1940 June. Vol. 4 No. 1 pp. 110–113. With 3 figs.

The author calls attention to kwashiorkor described by Cicely WILLIAMS in the Gold Coast [see this *Bulletin* 1934 Vol. 31 p. 344 1936 Vol. 33 pp. 410–734] and the condition recorded by H. C. TROWELL in Uganda [*idem* 1938 Vol. 35 p. 72], and states that he knows of no records of infantile pellagra in Malaya and gives an account as follows. A Chinese infant of 15 months was admitted to hospital at Penang with a history of fever, cough and loose stools for three weeks. It had been breast fed for 6 months and then on rice (probably polished) and sweetened condensed milk, and a little fruit and fish. On examination the child was anaemic and under-nourished, feet and hands a little oedematous, the skin generally rather dry and over the

limbs and neck darker than on the face and trunk and certain areas where desquamation had occurred were pale

Over the feet and knees the skin had desquamated but the rest of the legs was pigmented, the dark colour fading as the upper parts of the thighs were reached. On the prominent parts of the back of the iliac crests a similar condition was present and small points of desquamation gave a mottled appearance. The arms were similar but less severely affected. The hands and the backs of the elbows were pale but the rest of the arms was slightly more deeply pigmented than the trunk. Round the back of the neck there was again a mottled appearance from pigmented and desquamated areas. The angles of the mouth and the outer canthus of the left eye were sore. There was a small ulcer at the tip of the tongue. The vulva was red and sore.

There were crepitations, bronchial breathing and some dullness to percussion at the base of the right lung. Treatment with nicotinic acid and vitamin B₁ together with sulphapyridine for the pulmonary condition proved unavailing and death occurred 12 days after admission to hospital. At autopsy a basal pulmonary abscess was found which had penetrated the diaphragm and become adherent to the liver

H H S

PALLISTER (R. A.) Ataxic Paraplegia occurring amongst Chinese in Malaya.—*Trans Roy Soc Trop Med & Hyg* 1940 Aug 16. Vol 34 No 2 pp 203-211 [13 refs.]

Five years ago the author in conjunction with J V LANDOR, published a paper entitled Avitaminosis B₁ in which they described a condition possibly pellagroid which they observed in Malayan institutions (hence denominated Prison disease) characterized by angular stomatitis superficial glossitis eczema of scrotum and later nervous symptoms of pain numbness weakness of legs stocking anaesthesia and in some patients dimness of vision. [See *Bulletin of Hygiene* 1935 Vol. 10 p 733] The condition which is the subject of the present article bears many points of resemblance to the former. The following describes a typical case —

"The patient is a middle-aged Chinese and he complains of difficulty in walking and numbness of the legs of some months duration. He may in addition complain of some trouble with his hands especially if his work requires skilled movements. On examination he is found to be usually of ordinary nutrition without any distinct wasting of the limbs. The gait is rather unsteady and the feet placed a little apart for greater security. Though he may be able to get along fairly well at his own pace he is quite unable to hurry. The ataxia is not the same as a typical case of tabes dorsalis. The legs are not shot out in such an unco-ordinate manner and the knees are not hyper-extended but the patient will, like the tabetic, watch carefully the ground in front of his feet. There is no foot-drop and the calves are not tender to pressure. In Rhombert's position the patient is unsteady. The tendon reflexes are absent in the legs and Babinski's sign is flexor. Sensation is diminished or absent up to the ankles or knees and the position sense in the great toes is lost. In the arms the tendon reflexes may be present or absent and some sensory loss may be found about the hands.

The close affinity to the Jamaican disease Scott's palsy will be seen if the full description of the latter is compared [see also this *Bulletin* 1919 Vol. 13 p 372]. The absence of diarrhoea at the onset the peculiar distribution or limitation of the anaesthesia the variation to tests for touch pain kinaesthetic sense are points in common. No

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mention is made of reaction to heat and cold in Scott's cases this was almost the only sense reaction which was generally disturbed. The differences between the "prison disease" previously described and the present atonic paraplegia are with the exception of tingling and stabbing pains in the legs, very slight and largely matters of degree. Thus, there are numbness and weakness of the legs in both with "stocking" anaesthesia, but in the former (prison disease) there are tingling and pain and stiffness in addition the tendon reflexes are usually absent in the latter unsteady gait and Rombergism [not Rombergism] the sign is named after Moritz Heinrich Romberg of Berlin are present in both the diet in those suffering from the former was perked rice with moderate subsidiary diet in the latter polished rice and poor subsidiary diet. The author concludes after a very fair discussion that the condition he describes is probably pellagra modified by other factors in the diet or circumstances of those affected. [The article should be read in the original an abstract cannot do its merits full justice.] H H S

Studien ueber Pellagra in Chosen (Korea) I
sische und statistische Beobachtungen ueber
[Pellagra in Chosen (Korea)]
J. Dermatt & U

URABE (Kiyosi) Studien ueber Pellagra in Chosen (Korea) II
Mitteilung Klinische und statistische Beobachtungen ueber
Pellagra im Jahre 1939 [Abstract] [Pellagra in Chosen (Korea)
in 1939 Clinical Observations.]—Japanese J. Dermat. & Urol.
1940 Jan 20 Vol 47 No 1 pp 2-3
is more frequent in Chosen than in Japan, it is stated
in the first half of 1939 females were
and most were
unmarried
was seen on the back
and in the
E.

MADE (Kiyosi) Studien und klinische Beobachtungen über Pellagra im Jahre 1939 [Abstract]—*Japanese J. Derm.*
Mitteilung Klinische und sta...
Pellagra im Jahre 1939 (Abstract) —*Japanese J. Derm.*
In 1939 Clinical Observations.—*Japanese J. Derm.*
1940 Jan 20 Vol 47 No 1 pp 2-3

Pellagra is more frequent in Chosen than in Japan, it is stated. The author observed 38 cases in the first half of 1939 (females were more numerous than males [numbers unstated] and most were between 20 and 35 years of age. The rash was seen on the backs of the hands, dorsa of the neck, chest abdomen, genitalia and face. A few presented the "pellagra mask" and Casal's necklace. Eight had a pellagra tongue and in the majority gastro-intestinal disturbances were present. Ten suffered from obstinate peripheral neuritis. Blood changes were present in all in mild cases the haemoglobin (Sahli) was reduced to 70 per cent and in severe cases to 20 per cent, or less. The ascorbic acid content of the urine was usually below normal to 0.68 mgms per cent.

H H S

Sor un cas de pellagra (Note of Pellagra in Belgium).—*Bull. Acad. R. Med. Belg.* Vol. 4 No. 8 pp 408-410

VAN BOGAERT (L.) & VAN DEN BERGHE. Sur un cas de pellagre autochtone (A Case of Pellagra in Belgium).—*Bull. Acad. Roy. de Méd. Belgique*. 1839. 8th Ser. Vol. 4 No. 9 pp 409-418.

Very few cases of pellagra have been reported from Belgium as the author points out, many probably pass unrecognized. The case is then described of a 54 years old woman received into hospital at Antwerp with a six months history of symptoms progressively increasing in severity—painful paraesthesia of fingers, spreading to the hands and forearms, lancinating pains in all the limbs, pain in the tongue and scalp. There was difficulty in performing finer movements and walking was much impaired. The woman was depressed and miserable and spent her days hiding from the light, refusing to wash and eat. The memory was faulty and her story was in many parts untrue. There was some yellowish pigmentation of the skin of the face and the skin of the back and abdomen was scaly and of a dirty brown colour. The backs of the hands were also brown.

and the seat of marked keratosis the palms of the hands dorsa of the feet and ankles also showed hyperkeratosis. The tongue lips and gums were red and had a varnished appearance. Further examination revealed all forms of sensation in the skin together with vibration sense to be affected there was marked hypochlorhydria anaemia and leucopenia gastroscopy was negative the mucous membrane may have been a little pale and atrophic. Marrow obtained by sternal trephine showed no abnormal cells though the myelogram showed variations from the normal. The case was thought to be one of myxoedema fruste and the diagnosis of pellagra made on the scaly pigmented skin neuritic symptoms psychic disturbance hypochondriacal state etc.

There was no history of deficiency in the diet nor of diarrhoea associated with organic disease.

[The report is a rather disappointing one as so much is left unsaid and treatment including the use of nicotinic acid was left untried but the case is given at some length as it is one of those that may easily be missed.]

H S S

CAMPBELL (S B Boyd) & ALLISON (R S) Pellagra, Polynenritis and Beriberi Heart.—*Lancet* 1940 Apr 20 pp 733-739 With 5 figs.

Of the two cases described one is that of a fairly typical pellagra the other with a mingling of the symptoms of pellagra and beriberi. The first patient was a man of 31 years who stated that ten days before coming into hospital he noticed that the backs of his hands were swollen and of a dark brown colour and his face and neck became similarly pigmented. Five days later his legs swelled he had difficulty in walking and when admitted could scarcely raise his legs from the bed. Sensory symptoms were slight no numbness no pain in muscles. The legs were oedematous and patellar reflex sluggish Wassermann reaction was negative. He was given Bemax by mouth and vitamin B₁ by injection. Improvement was rapid the oedema disappeared and leg movements were almost normal six days after admission. The back of the hands the face and neck desquamated.

The second patient was a woman of 58 years who stated that her legs became red and itchy next day a rash appeared on the extensor surfaces of arms and legs and later the backs of the hands, the face and the neck became dull red, later brown. She had diarrhoea for five weeks with wasting but no oedema. Treatment with Bemax and nicotinic acid resulted in a gain of 11 lb in 4 weeks and disappearance of the rash. In this patient there was certainly deficient intake of vitamin B₁, possibly aggravated by the diarrhoea and achlorhydria. In the first there was no deficiency of intake the food was adequate but there may have been some unrecognized cause interfering with absorption leading to signs of deficiency of two types.

H H S

RAMAN (T K.) Pellagra in India. A Study of Twenty-Five Cases in Vizagapatam.—*Indian J Med Res* 1940 Jan. Vol 27 No 3 pp 743-756 With 12 figs. on 3 plates. [25 refs.]

The author finds for his hospital at Vizagapatam [on the coast of the N E corner of Madras] that pellagra accounts for 0.65 per cent. of admissions to the medical wards. Ten cases were admitted in 1937

eleven in 1938 twenty-one in 1939. Of these, 25 form the basis of his article and case notes are given of 8 patients. The subjects belonged to a country where rice is the main article of diet. Pellagra was found in persons suffering from tuberculous peritonitis, beriberi, leprosy, carcinoma of the penis, stricture of the urethra, hemiplegia or diabetes or who had undergone operation for duodenal ulcer. In some cases the disease may have been an aetiological factor. The paper is a long one and accompanied by some excellent photographs. Among the findings recorded are the following: the anaemia present may be of macrocytic, normocytic or microcytic type; gastric acidity is commonly low with absence of free acid but there may be an hyperchlorhydria; blood protein, especially albumin, is low and cholesterol values decreased, these become normal with treatment; there is an increase in total fats in the stool, with a relative increase of both neutral and spirit fats.

The paper makes an interesting contribution concerning pellagra in India. H S S

GOODALL (J W D). Observations on the Use of Nicotinic Acid in the Treatment of Pellagra and Allied Conditions.—*Indian Med Gaz.* 1940 Mar Vol 75 No 3 pp 147-153 With 3 figs

Writing from the Presidency General Hospital, Madras Captain Goodall says that "In India cases of pellagra are frequently met with." He then goes on to describe some twenty patients, treated with nicotinic acid, whom he divides into three groups: (a) Those with true or chemical pellagra—3 (b) cases of "nicotinic acid deficiency"—12 (c) miscellaneous—5 pointing out at the same time that the difference between (a) and (b) is only a question of degree.

Group (a) included 1 Hindu agriculturist and 2 unemployed Anglo-Indians; all responded satisfactorily to nicotinic acid therapy. Of those in group (b) all persons belonging to the poorer classes subsisting on rice and dal, 5 showed a glossitis, 7 had gastro-intestinal symptoms, in 11 there was "some change" in the skin, attributed by the patients to the cold weather; in 7 the patellar reflex was increased. Two subjects also showed signs of beriberi. All were mentally dull and apathetic; in all there was discovered a hypochlorhydria and a hypochromic anaemia. All this group improved under treatment with nicotinic acid. In group (c) were included five cases of secondarily infected scabies of hands, feet etc. commonly associated with mental apathy. The administration of nicotinic acid resulted in the most striking and rapid peeling off of all the crusted lesions. Several photographs are reproduced but unfortunately they show very little. H S S

BARLOVATZ (A). Glossite marginale et stomatite angulaire. [Marginal Glossitis and Angular Stomatitis].—*Ann Soc Belg de Med Trop* 1940 Mar 31 Vol 20 No 1 pp 13-22

Many cases of glossitis and angular stomatitis are seen among miners in the Lower Congo. The incidence is much higher (five times or more) among men than women. Of 1,356 men and 463 women examined the percentages affected were: Desquamating or exfoliating glossitis 5.9 and 0.8; erosions at the angles of the lips

3.5 and 0.3 both these present in 6.2 and 1.2 per cent. The men were working at posts some distance apart and the numbers affected varied greatly. At one post only four were found among 156 or 2.6 per cent. at another 151 out of 336 or 42 per cent. In this last were but a few cases of beriberi—these were more numerous at other posts. Nicotinic acid has been found to bring about speedy amelioration to stomatitis and glossitis patients but the author found vitamin B₁ very useful. The condition has been ascribed to the quantity of fish dried or salted consumed and in places where groundnuts and bananas were eaten also these cases were not observed. In the author's hands the giving of vitamin B₁ has yielded the best results and the signs are very much like those seen in Wright's vitamin A and B deficiency [see this *Bulletin* 1936 Vol. 33 p 887 also *Bull of Hyg* 1929 Vol. 4 p 391]

H H S

ELVEHJEM (C A) Relation of Nicotinic Acid to Pellagra.—*Physiological Reviews* 1940 Apr Vol. 20 No 2 pp 249-271 [128 refs.]

LAVARELLO (Aldo O) El ácido nicotínico su acción y su importancia en clínica [Nicotinic Acid. Its Action and Importance in Clinical Medicine]—*Prensa Méd Argentina* 1940 Apr 10 Vol 27 No 15 pp 786-800 With 2 figs. [17 refs.]

LEWY (F H) SPIES (T D) & ARING (C D) The Incidence of Neuropathy in Pellagra. The Effect of Cocarboxylase upon its Neurologic Signs.—*Amer J Med Sci* 1940 June Vol 199 No 6 pp 840-849 With 1 chart [14 refs.]

Previously it had been demonstrated that the skin lesions and some of the neurasthenic symptoms of pellagra cleared up under treatment with nicotinic acid amide while others were uninfluenced such as pain in the calves numbness of the extremities weakness difficulty in walking dizziness lassitude fatigue increased sensitivity to light and noise loss of memory insomnia irritability—though many of these symptoms were relieved by the administration of thiamin. Further some patients thus relieved developed symptoms of riboflavin deficiency.

In the present article the authors give their results with cocarboxylase (the phosphorylated ester of thiamin) in 50 white pellagrins classed as mild 16 moderately severe 23 severe 10 and 1 very bad case all of whom exhibited some neuropathic symptoms. Among those of the first two groups three-quarters of the cases showed abnormal electric excitability of motor nerves and tenderness of nerve trunks, one-third decrease of pain sensibility and pupillary reflex with ataxia in a fifth the corneal reflex was diminished muscle power lessened sensibility to touch lowered, nystagmus and deviation of the tongue were noted together with Romberg's sign pyramidal signs and mild Parkinsonism. A single intravenous injection of cocarboxylase was followed in a short time by rapid improvement under excitable nerve-muscle apparatus was restored to normal in 1 to 4 hours. In some cases symptoms persisted showing that the pathological process had reached an irreversible stage. It is shown, therefore that cocarboxylase has a similar action to thiamin.

H S S

SMITH (Susan Gower) & MARTIN (David W) Cheilosis successfully treated with Synthetic Vitamin B₂.—*Proc Soc Experim Biol & Med* 1940 Apr Vol 43 No. 4 pp. 660-663. With 1 fig [10 refs]

Four cases are reported. The first a girl with pellagra and severe anaemia, was treated with synthetic vitamin B₂ hydrochloride. After a few doses of 20 to 40 mgm intravenously the cheilosis healed completely and the anaemia responded although the diet on which the patient was maintained (low in the B complex and especially low in riboflavin) contained little iron. The second patient received larger doses intravenously and by the mouth and the cheilosis was entirely healed on the fifth day but anorexia anaemia and severe weakness were unaffected. In the third case the cheilosis developed while the patient suffering from coeliac disease was on a diet of milk and bananas. The mouth lesions healed completely on treatment with vitamin B₂ hydrochloride. The fourth patient was suffering from sprue and was extremely deficient in many of the vitamin factors. Slight improvement followed the administration of B₂ but complete healing did not occur even when riboflavin and nicotinic acid were added. The addition of concentrated liver extract given intramuscularly however brought about cure. Two other patients are recorded in a footnote one responded to B₂ the other to riboflavin.

There are three possible explanations of the fact that both riboflavin and B₂ cure cheilosis —(1) That deficiency of riboflavin is primary and deficiency of B₂ acts only indirectly (2) The reverse (3) That both factors are necessary to maintain healthy lips and that a deficiency of either will precipitate the lesion C IV

GOLDSMITH (Grace A) OGAARD (Adolph T) & GOWK (Donald F) Vitamin C Nutrition in Pellagra.—*Amer J Med Sci* 1940 Aug Vol 200 No 2 pp 244-249 With 1 chart

The diet of patients who develop pellagra is often low in ascorbic acid it seems likely that ascorbic acid values would be low in these patients. Eighteen patients with pellagra were tested. The symptoms were severe in 12, mild in 5 while 1 showed only glossitis associated with severe proctitis and vaginitis. The method of investigation was as follows —

"The intravenous tolerance test was carried out as follows. The level of ascorbic acid in the plasma was determined before the intravenous administration of 1 gm. of crystalline ascorbic acid and at 20 minutes, 2, 4 and 8 hours following this administration. The urinary excretion in the subsequent 5 hours was likewise measured as suggested by Wright. The oral tolerance test was performed as described by Goldsmith and Ellinger. 600 mg of ascorbic acid were given by mouth the amount excreted in the urine in the subsequent 6 hours measured, and the level in the blood determined at the end of 1 and of 3 hours. The ascorbic acid in the blood was determined by the method of Farmer and Abt, that in the urine by titration with 2,6-dichlorophenol-indophenol after acidification with glacial acetic acid."

In 8 of 14 pellagrins tested an ascorbic acid deficiency was found. 4 additional cases showed less than the normal amount of ascorbic acid in the blood during fasting. Three persons who had recovered from

pellagra some 3-6 months before still complained one of weakness, anorexia and loss of weight a second of vague gastro-intestinal symptoms and a third of purpuric areas in the skin. All were found to have a vitamin C deficiency and all showed rapid clinical improvement on appropriate diet and ascorbic acid 200 to 300 mgm. daily

H S S

LEONIDA (Josif) Ueber die hormonale Therapie der Pellagra. [Hormone Therapy in Pellagra.]—*Arch f Schiff's u Trop Hyg* 1939 Oct Vol. 43 No. 10 pp 440-451

MISCELLANEOUS

SCOTT (H Harold) Treatment of Tropical Disease.—*Britain To-day* 1940 July 26 No 32. pp 4-8 With 5 figs. on 2 plates

This is a short paper written for the lay reader, in which the author has given an outline of the difficulties encountered by those responsible for improving or maintaining the health of the indigenous populations of tropical countries and of the methods employed to cope with the problems raised. In view of the ignorance of the true causes of disease displayed by native peoples it is essential to gain their confidence in the value of modern medical procedures, and to this end curative medicine must first be stressed by the institution of hospitals and dispensaries for the treatment of existing ailments. The provision of sound sanitation and the principles of preventive medicine are next insisted upon with the object of avoiding those major diseases which are so ruinous in tropical countries. These measures, of course are largely concerned with the eradication of insect vectors of disease.

Deficiencies in diet are common in these countries, and to correct them closely combined action by the medical, agricultural and veterinary departments is necessary. Health education of the populace is provided at schools and by mobile Health Units and in many places medical schools have been founded at which selected natives are given instruction which qualifies them to perform the duties of subordinate medical officers in their own countries. This is a necessary provision since the European medical staffs cannot themselves cope with the large population concerned. Dispensers, dressers and nurses are also trained locally in large numbers.

The author concludes with remarks on the encouragement given to research workers by the Colonial Office and by certain scientific bodies and adds a few paragraphs in homage to British workers, from Manson onwards, who have done so much to advance the knowledge of tropical disease.

The article is a clear and authoritative statement of those first principles which guide British medical policy in the Colonies, and may be read with advantage by medical men interested in that policy

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C IV

D

FIELD (J W) A Simple Method of preserving the Outlines of Leucocytes and Malarial Parasites in Giemsa-stained Thick Blood Films.—*Trans. Roy Soc. Trop Med & Hyg* 1940 Apr 30. Vol. 33. No. 6. pp 635-638. With 8 figs. on 1 plate.

It is usually recommended that thick blood films should be dried for several hours before staining in order to avoid distortion of the leucocytes and parasites and this tends to limit the usefulness of this method in the diagnosis of malaria. A chance observation that the cytoplasm of leucocytes and blood protozoa is protected from the damaging effects of lysis by a brief preliminary treatment with a basic stain led to the adoption of the procedure described, which is successful with thick films as soon as the blood ceases to be obviously moist. The preparation of the solution and the procedure are as follows —

" Methylene blue 0.5 grammes

" Disodium hydrogen phosphate ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$) 3.7 grammes

" Monopotassium dihydrogen phosphate (KH_2PO_4) 0.5 grammes.

" Distilled water 100 cc

(a) Dip the films for 1 second into a jar containing the methylene blue solution.

" (b) Wash for a few seconds by waving *very gently* in a vessel containing clean tap water

" (c) Place the films in a staining trough add diluted Giemsa stain and allow them to remain in the stain for from half to 2 hours, according to the concentration of stain

" (d) Float off the stain by allowing a little tap water to trickle into the staining trough.

" (e) Remove the films from the trough and place vertically to dry "

The methylene blue solution is isotonic and buffered to pH 7.2. Dispersal of cytoplasm is largely prevented and the outlines of the parasites are well retained. Giemsa diluted 1 drop to 4 cc and used for 1-2 hours staining gives a cleaner background than stronger solutions.

C IV

GAVERLOV (W) & NIJS (J) Appareil à déshéatation à températures ordinaires et basses. [An Apparatus for Desiccation at Normal or Low Temperatures].—*Ann. Soc. Belge de Méd. Trop* 1939 Dec 31 Vol. 19 No. 4. pp 527-531 With 1 plate.

The apparatus consists of —

The pump is then set going. Under these conditions tissue cut into small pieces and the size of the index finger is dried in 4 to 6 hours and needs $2\frac{1}{2}$ to 3 kgm. of solid CO_2 .

Virus of herpetic encephalitis desiccated in this manner retains its virulence in full for one to two months and the method may be suitable to work with the viruses of tropical diseases. C 17

MCKENZIE (A) Nutritional Diarrhoea a Critical Examination.—
East African Med J 1940 Apr Vol 17 No 1 pp 30-45
[15 refs.]

The condition is described as a severe form of afebrile diarrhoea unrelated to infection with micro-organisms helminths or protozoa, accompanied by wasting and frequently terminating in death. Of 320 cases seen during the last 4 years in the Morogoro hospital (Tanganyika Territory) 142 have died. The disease in this district occurs almost exclusively in labourers on sisal plantations who live in compounds. The standard ration was—maize meal 24 oz. daily, beans 6 oz. daily, ground nuts 4 oz. twice weekly, fish or meat 4 oz. twice weekly. There was little opportunity of buying additional food of good nutritional quality and the rations were issued uncooked. Rations were not issued for days on which work was not done and as it was estimated that 30 days' work was completed only in an average of 45 to 55 days it is evident that the full daily calory value of 3 000 was rarely attained. The diet was therefore quantitatively inadequate, it seriously lacked animal protein, vitamins A and C and the cooking was generally inadequate since it was done hurriedly and fuel was not easy to obtain.

The disease is afebrile. It commences after a period of work of about 6 months or more. There are 4 to 10 watery stools a day, containing undigested debris but no mucus and no blood. The patient is emaciated, with low blood pressure and feeble circulation and follicular keratosis is common. Angular stomatitis and glossitis of the pellagra type were not seen. The best form of treatment was found to be a small saline purge followed by large and frequent doses of kaolin and rectal enemata of cod liver oil were valuable. Saline and glucose may be given by enema or by injection. This treatment was combined with a standard diet consisting of a dish of well boiled rice to which was added red palm oil, minced liver slightly scalded and fresh grated pawpaw. Massive doses of vitamin A, nicotinic acid and liver extracts gave little result and vitamins B and C produced no effect. When the critical phase was past attention was paid to hookworm or other conditions present. It is pointed out that unless gain in weight takes place, cure is not established and relapse, sometimes fatal, may follow. To return cured patients to work under conditions which brought on the disease is to court relapse.

The pathological appearances of the intestine were largely those of degeneration of epithelium with numerous haemorrhages which may indicate deficiency in vitamin C. Pathogenic organisms were rarely found in faeces plated out.

In discussion of these findings McKenzie points out that during the past 18 months the incidence has fallen remarkably largely owing to improved dietetic conditions in the plantations and to better medical care there. An issue of red palm oil is now instituted on most estates. He refers to pellagra and concludes that nutritional diarrhoea

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The apparatus consists of —

1 An electric vacuum pump or a water exhaust provided that the pressure can be lowered by almost 760 mm. Hg. This communicates by a vacuum tube provided with a two-way tap with

2 The condenser a pyrex flask of 750 cc. half filled with anhydrous calcium chloride and placed in a Dewar bell.

3 A horizontal glass tube closed at its end and provided with taps and connected with a mercury vacuum meter and with the condenser. To the taps are fitted the tubes containing the material to be dried.

Solid CO_2 is placed in the Dewar bell around the condenser and the temperature falls to about -80°C and the tubes containing the material to be dried are similarly cooled with solid CO_2 and methyl alcohol. In the tropics where solid CO_2 is not available it may be prepared from liquid CO_2 by apparatus designed for the purpose.

If the anhydrous salt is used the amount of sodium hydrogen phosphate should be 1.46 grammes.

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does not show the classical signs of that disease. Apart from the quantitative lack of food and the impossibility of tracing the origin to the absence of any single dietetic factor however it is possible that the condition may be the result of the lack of a combination of factors and that it is precipitated by undernourishment added to previously existing malnourishment. [This record of careful work should prove of the greatest value for those who are in medical charge of, or who legislate for plantation labourers.] C IV

ROBERTSON (R Cecil) The Problem of Endemic Goitre in Yunnan Province.—Reprinted from *China Jl* 1940 Jan. Vol 32, No 1 pp 28-36. With 1 map in text & 17 figs on 8 plates.

The incidence of goitre among the inhabitants of Yunnan Province is high, and some show symptoms of cretinism. Investigation has shown that iodine is deficient not only in the salt but also in the vegetation. Now that the Japanese are occupying the hinterland of China the latter is deprived of its coastal salt supply and is obtaining salt from the Yunnan mines hence if hostilities are prolonged the iodine deficiency will become more acute. An advisory committee, the Yunnan Anti-Goitre Association, has been formed to study the question, to plan and promote anti-goitre measures, to arrange surveys periodically and maintain a liaison with anti-goitre work elsewhere.

In some parts of the Province the incidence is as high as 80 per cent. and a large proportion is of the parenchymatous variety. The patchy distribution of the goitre districts in Western Yunnan and the Shan States is thought to be connected with the geological formation. Iodine will doubtless benefit some, and more particularly the slighter cases, but others would need surgical intervention. Several instances have been noted of students coming into the district from coastal provinces where goitre is not endemic and developing the condition; a residence of six months seems to be sufficient in a susceptible subject. The article is illustrated by well-reproduced photographs.

H H S

CASTELLANI (Aldo) Brief Notes on Some Little-Known Fevers.—*Jl. Trop Med & Hyg* 1940 Feb 1 Vol. 43 No. 3 pp. 33-37 With 2 charts [14 refs.]

Tropical low fever is insidious in onset with intermittent fever rising at midday to a limit of 102°F. Eosinophilia may be present, the course may be long, no signs of the usual causes of fever may be found and anti-malarial drugs are ineffective. Recovery quickly follows a change from a hot to a temperate climate. Points in differential diagnosis from 17 forms of low fever of known origin are given.

The author describes a non-malarial quartan fever and a quartan fever of toxic origin, of which he has seen only one case. Plurindian fever in which the temperature may rise twice or thrice during the day is referred to again the aetiology is unknown and drug treatment unavailing, but the condition responds to transfer to a cool climate. Intermittent urticarial fever is characterized by quotidian, tertian or quartan fever with attacks of urticaria and occasional joint swellings; the causation is unknown but it is probably of an allergic nature, it must be differentiated from similar conditions seen in infections with

Schistosoma japonicum Ascaris or Taenia A high intermittent non malarial fever is seen in children in Ceylon here again change of climate stops the condition almost at once. Garden fever is a short summer fever seen in S Europe and in Africa. In most instances it develops after an afternoon's gardening and may be due to the bite of some insect. In some cases there is a high platelet count. The fever lasts from 3 to 6 days and may be of the saddle-back type.

Double continued fever begins insidiously the temperature rising to 104°F and remitting about 3° daily with slow pulse moist red tongue and constipation. After 10 to 15 days lysis occurs and the temperature is normal for 2 to 7 days thereafter rising to a second paroxysm similar to the first and lasting about 10 days. Anaemia is present and convalescence slow it has been suggested that in reality the cases seen have been enteric or undulant fever.

Summer fever of the Gulf Stream is another condition attributed to climatic influences.

The author discusses the hypothesis of DE LANGEN and SCHUT that in the tropics the sugar content of the blood is higher than in Europe owing to stimulation of the suprarenals by heat and humidity. The burning up of the sugar may raise the body temperature. Due consideration is paid to the elimination of other disease including tuberculosis in the diagnosis of these fevers. [The premenstrual rise of temperature which has been noted in England may be exaggerated in the tropics and may cause considerable disquiet if not borne in mind.]

C IV

LASSMAN (P) La réaction de sédimentation chez les noirs du Congo belge. [The Blood Sedimentation Rate of the Natives of the Congo] —*Ann Soc Belge de Méd Trop* 1939 Dec 31 Vol 19 No 4 pp. 557-560

The author tested the blood sedimentation rate of 1,258 healthy labourers by the method of Westergren reading the results after one hour. In Europe a fall of 20 mm. in this period is regarded as the limit of the normal but in these natives a fall of 20-30 mm. occurred in 541 of 30-40 mm. in 245 and of more than 40 mm. in 143. The physical condition and the medical history of these men, often available over several years confirmed the fact that they were in excellent health and the author therefore gives a warning that since readings usually regarded as absolutely pathognomonic are frequently seen in the healthy natives care should be taken in drawing conclusions from this test in isolated cases. In a series of cases of pulmonary tuberculosis the readings were high (all were over 30 mm.) in cachexia due to different causes they were also in general rather high, but in tropical ulcer great variations were found.

C IV

OLMES DE CARRASCO (Hede) Einige neuere Gesichtspunkte für die Behandlung des Maltafiebers [Fresh Viewpoints in the Treatment of Undulant Fever] —*Arch f Schiffs u Trop Hyg* 1939 Nov Vol. 43 No 11 pp 500-513 [25 refs.]

Twelve cases are recorded with detailed blood and other examinations. Four were treated with prontosil rubrum in 0.5 gm. tablets

CALDWELL (A. F.) Hydrogenated Fats in the Preparation of Ointment Bases for Tropical Countries.—*Quarterly Jl Pharm & Pharmacol* 1939 Oct-Dec Vol 12 No 4 pp 689-698

"1 Hydrogenated palm kernel oil, melting point 40 to 42°C., is a suitable fat to replace lard and suet in ointments in tropical countries

"2 By altering the degree of hydrogenation the melting point of the hydrogenated fat can be altered

"3 It shows little tendency to become rancid

"4 A mixture of hydrogenated palm kernel oil with 12.5 per cent. of soft paraffin forms a suitable ointment base for use in Malaya, where absorption or penetration of the ointment is required

CALDWELL (A. F.) Suppository Bases for Use in Tropical Countries.—*Quarterly Jl Pharm & Pharmacol* 1939 Oct-Dec Vol 12 No 4 pp 690-693

"1 The addition to cocoa butter of substances which are soluble in fats rapidly lowers the melting-point and also lowers the transition temperature

"2 The use of hardening agents such as beeswax is not recommended, as the transition temperature becomes too close to the temperature at which the mixture softens sufficiently to mould suppositories. In temperate climates hardening agents may be satisfactory but for the contemporaneous dispensing of suppositories in the tropics they are useless.

"3 With proper manipulation and correct control of temperature, using a thermometer suppositories can be made in tropical countries with cocoa butter provided they do not contain medicaments which lower the melting-point to such an extent that they remain soft at room temperature.

"4 It is recommended that the monographs of the British Pharmacopoeia and British Pharmaceutical Codex be modified, as they are of no assistance in the present form to dispensers in the warmer parts of the British Empire

"5 The statement that the base should melt at 37°C means very little unless the method of taking the melting point is given. It is recommended that a base should be just pourable at temperatures not above 40°C

"6 Hydrogenated palm kernel oil having the physical and chemical characters shown in the previous report is suitable for use as a suppository base in warm climates. In cases where the base is too soft owing to a high temperature or where the melting-point is lowered by soluble medicaments it may be hardened by the addition of hydrogenated soya bean oil, melting point 56°C or beeswax. For general use in Malaya in suppositories containing no soluble medicament the addition of 5 per cent. of hardened soya bean oil is satisfactory but if fat-soluble substances are present the amount of hardening agent must be increased

"7 There is little change to a metastable state when the palm kernel oil is heated to temperatures well above the softening-point and the lowering of the melting point due to this change is too small to be of any practical significance

"8 The cost of hardened palm kernel oil compares favourably with that of cocoa butter "

SKYBERLICH & LÊ THỊ VAN Action véritablement merveilleuse d'un pansement annamite à base de plantes [Surprising Effect of an Annamite Dressing made from Plants].—*Rev Méd. Française d'Extrême-Orient*, 1939 Dec No 10 pp 1129-1131 With 1 plate.

The authors record the case of a man of 34 years with two large suppurating buboes, each larger than the palm, indolent and very

resistant to treatment. He had hot antiseptic applications bismuth iodoform antidiphtheria serum scraping partial excision protein shock autohaemotherapy vitamin A etc but without any lasting benefit any attempted healing rapidly breaking down again (The W.R. was negative). After 5 months his general state was poor and the local lesions showed no signs of healing and the patient left hospital at his own request. Six weeks later he presented himself and, though still weak he was stouter and the wounds were firmly cicatrized. He stated frankly that he had placed himself in the hands of a Sino-Annamese woman who applied a plant plaster twice a day to the site and in a month the place had healed completely.

The authors interviewed the woman who told them without reserve that she used the leaves of three plants growing in the woods of Huyên, Tùng Thiên and these were identified by Professor Pételot of the University of Hanoi as *Acronychia laurifolia* Smilax and guava. The last is fairly common but the others belonging to the Families Rutaceae and Liliaceae respectively are rarer. These were planted in the gardens of the Son Tây Hospital but the conditions of growth were evidently not suitable for they died small and stunted.

The method of employment is as follows. The leaves are cut up finely and wrapped in a piece of banana leaf this is folded over fixed with a needle of bamboo and applied to the wound. The dressing is renewed twice a day [applied twice a day]. That the healing was not mere coincidence is probable because state the authors they have since treated in this way six other patients with indolent wounds and in every case a rapid cure has resulted. The leaves are depicted. H H S

BEASON (Robert L.) Diagnosis of Hypersensitiveness to the Bee and to the Mosquito with Report on Successful Specific Treatment.—*Arch Intern Med* 1939 Dec Vol 64 No 6 pp 1306-1327 With 4 figs. [31 refs.]

The author gives an account of cases of extreme sensitiveness to the stings of bees and the bites of mosquitoes. In these there is an immediate weal of considerable size followed by extensive inflammatory infiltration reaching its maximum in 24 to 48 hours and lasting for several days. These effects are due to antigens distinct from venom which can be obtained in extracts of the bodies of the insects. They are specific in regard to the group rather than to the species.

Desensitization can be effected by intracutaneous inoculation of extracted antigen preferably precipitated from fluid extracts of the insects with cold alcohol or saturated solution of ammonium sulphate and later dissolved (prepared antigen can be obtained from the Lederle Laboratories). These antigens give rise to both the early weal and the later inflammation and courses of inoculations or in some cases even a single inoculation eliminate the late severe reaction but do not influence the early and innocuous weal. The protection afforded may last for several years. C IV

EARLE (H. Vigors) Pathological Effects of Two West Indian Echinoderms—*Trans Roy Soc Trop Med & Hyg* 1940 Jan 29 Vol 33 No 4 pp 447-452 With 2 figs. [12 refs.]

The author describes the effects of penetration of the spines of two varieties of sea urchin the white and the black and of ingestion of the eggs of the former.

The white sea urchin the edible sea-egg of the West Indies *Tripneustes esculentus* has a size up to 14 by 9.5 cm. and is covered with short, sharp slender spines. Inside the shell lie the eggs, which are eaten either raw or boiled and fried. Penetration of the spines, though these are not poisonous, usually leads to suppuration, calling for removal by the knife. The eggs are in season from September to April and in susceptible persons the eating of them may be followed by abdominal symptoms—epigastric pain, nausea, vomiting and diarrhoea. Such persons may show idiosyncrasy to other shell-fish. Of course incidental infection by bacteria or their products may arise.

The black sea-urchin the cobbler of Barbados, *Centrocirrhus antillarum* is found on the sea-bed and also adhering to rocks, piers, breakwaters etc. Its size is 10 by 8 cm. with long spines, 30–40 cm. These are sharp and have small barbs along their whole length directed towards the point and hence they should be easy to remove but the spines are very brittle and any attempt at removal usually results in their breaking off in the wound. From the spines there exudes a reddish fluid which acts as a powerful irritant and causes intense pain if the spines break. Suppuration is rare and as a rule the foreign body is removed by clasmatocytes within 48 hours, and merely a local dressing is needed. If the sole of the foot is wounded, the administration of a prophylactic dose of antitetanus serum is advisable.

H H S

STILL (R. M. Lloyd) Remarks on the Aetiology and Symptoms of Young Dah-Hie with a Report on Four Cases and its Medico-Legal Significance.—*Indian Med Gaz.* 1940 Feb. Vol. 75 No 2. pp 88–91

The literal translation of young-dah-hie is "to be ticklish and nervous". The author speaks of two types. In one the individual reacts to sudden stimuli by imitating words or gestures of those about him in the other a sudden touch or auditory stimulus causes a jumping or recoil as though the subject was severely frightened. In either form he may utter some obscene epithet. The first type seems to be nearly related to *latah* and the second to the convulsive tics (*cf* Gilles de la Tourette's disease). Mongolian races seem to be particularly predisposed, but heredity does not seem to play any part. The more immediate cause is shock, or worry or observation of or contact with one so affected. Mentally they are as alert as their fellows, and beyond hyperaesthesia and exaggerated reflexes, show no abnormal physical signs.

Four cases are detailed, three of type one and one of type two. The first a Burmese woman of 33 years showed a condition rather closely allied to *smok* and had murdered her husband apparently without motive. When tested she was markedly imitative (*latah*) would repeat a question if asked in a loud tone but would answer rationally if addressed quietly [this is noted in young-dah hie]. The second was a Burman of 60 years, who when he was brought a block of wood for a pillow by a stranger in a rest house and the stranger inadvertently dropped it picked up the block and hurled it at the man and killed him. He too was found to be imitative and had been so for 7 or 8 years for example on watching a man swimming he fell on the ground and made swimming movements on land. This patient, was, however found to be suffering from cerebral syphilis. Of the other

two one was markedly imitative, repeated questions and shouted and responded to sudden stimulus with abuse or an epithet. The other typically responded with a jump and appearance of fright if touched, tickled or shouted at.

The author compares the condition described with allied complaints such as *latak amok bangs schamanismus* and *nat-win-de*. It differs from *latak* in that in *latak* the patient remains in the imitative condition as long as the examiner chooses once the patient is thrown into this state but in *young-dah-hle* the patient is always in this state and liable to react. *Amok* is a psychical disturbance in which there is a violent attempt to kill after which there is a stuporous condition and perhaps amnesia. *Bangs* is described as a hysterical condition among women in the Congo about the time of puberty. The subject may be convulsed or rushes into the open country or jungle uttering wild cries. *Schamanismus* is a condition of religious eroticism resembling the old dancing mania. Lastly *nat-win-de* is also a sort of religious dance with swaying movements and closed eyes started by a professional and taken up by others. The performers are said to have no recollection afterwards of what they have done.

H H S

REID (J D) SCHERER (J H) & IRVING (H) Systematic Histoplasmosis in the United States.—*Science* 1940 Mar 15 Vol. 91 No 2359 p 264

The authors say they have had the opportunity of studying a case of histoplasmosis in a coloured male adult in St. Philip's Hospital, Richmond, U.S.A. and express it as their opinion that such cases must be more common than the published reports would lead one to suspect. It is suggested that a finding of anaemia with leucopenia in a weakened, emaciated subject running a septic temperature should lead to search of the blood for infected monocytes or examination of material obtained by puncture of the sternum, as the parasites occur in enormous numbers in the marrow.

C M Wenyon

CLEMENS (Harry H) & BARNES (M L.) Histoplasmosis of Darling. Report of a Case.—*Southern Med J* 1940 Jan. Vol 33 No 1 pp. 11-15 With 8 figs. [27 refs.]

The case described is that of a 33-year-old negress in Kentucky who died of a generalized *Histoplasma capsulatum* infection. The organism was isolated in culture from the blood 28 days before death. The post mortem appearances are described and a series of microphotographs illustrate the pathological changes.

C M W

REYER (Wilhelm) Infektionsversuche mit Blastozysten. [Attempts at Infection with Blastozysts].—*Zent f Bak* I Abt Orig 1939 Oct. 9 Vol. 144 No 7-8. pp 421-425

The author shows that the human blastocystis will not infect dogs or rats while the naturally occurring rat blastocystis cannot infect mice. Rats are readily infectible with blastocystis from rats. These experiments seem to prove that the contention of ALEXIEFF that all blastocystis belong to the one species *Blastocystis enterocola* is incorrect. When the blastocystis is cultivated it changes its morphology and at the same time loses its capacity for infecting the natural host.

C M W

fever dysentery and diseases due to parasitic worms. The fifth section contains information on skin conditions, wounds, insect bites, myiasis, venereal disease and smallpox. The sixth section is concerned with alcoholism, effects of the sun, dental disease and snake bite.

In the succeeding section are given the fundamental facts on the identification of the genera of mosquitoes, and on prevention of breeding on flies and on disposal of refuse excreta and waste water and finally there is a list of medical stores necessary for personal use and instructions on the taking of blood films.

The book is illustrated. It is direct and practical and will undoubtedly be valuable to lay readers. It was written by the late Dr A. J. R. O'BRIEN when he was Chief Medical Adviser to the Secretary of State for the Colonies.

C. H.

BLACKLOCK (D. B.) [M.D. (Edin.) D.P.H. (London) D.T.M. (Liver) etc.] & SOUTHWELL (T.) [D.Sc. Ph.D. A.R.C.Sc. F.Z.S. F.R.S.E. etc.] *A Guide to Human Parasitology for Medical Practitioners.* Fourth Edition.—pp. viii+259. With 2 coloured plates and 122 text figs. 1940. London: H. K. Lewis & Co. Ltd. [12s. 6d.]

The fact that this small handbook has passed through four editions within a period of ten years is sufficient testimony of its value. Apart from slight modifications in the description of the life-history of *Strongyloides stercoralis* and one or two other minor matters necessitated by recent advances in knowledge the present edition is unchanged.

W. J. ORR.

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN.

Vol. 37]

1940

[No. 12

PLAGUE

PRÉCIS OF ABSTRACTS IN THIS SECTION

HAMPTON (p. 822) traces the history of plague in the United States and details the large number of wild rodents which have now been found to be infected. MILLER (p. 823) thinks that wild rodents of western Canada must eventually become infected with plague owing to the extension of sylvatic plague in the United States and shows that a gopher *Citellus r. richardsoni* has been found infected in Alberta.

SAENZ VERA (p. 824) shows that in parts of Ecuador plague occurs in recurrent epidemics which are usually preceded by epizootics in rats and guinea-pigs. Field rodents constitute the reservoir and the link between them and man is the cat. The disease is essentially rural and there have been no alarming epidemics owing probably to the fact that the rats are found in fields of sugar cane where food is abundant. PINOTTI *et al.* (p. 824) record a small epidemic in a village near Rio de Janeiro which was preceded by an epizootic in rats. They consider however that this was not an exacerbation of an enzootic but that the infection had been introduced from Rio de Janeiro.

LAMBORN (p. 824) in Nyasaland has found that in an area where there occurred an outbreak of plague a mild enzootic among field rodents had been in existence for some time.

SORHEY (p. 825) shows that *P. pestis* has a definite capsule but he does not recognize what has been regarded by other workers as the envelope. The capsule is present in both virulent and avirulent strains and the antigenic value of the organism does not seem to make any difference in that the capsule is present in strains of both high and low immunogenic power.

RAO (p. 825) has investigated the capacity of *P. pestis* to oxidize various substances. Carbohydrates especially hexoses, certain organic acids and amino-acids are oxidized and it has been found that for culture glucose and lactic acid are the best sources of carbon. A list of the useful amino-acids is given. The same author (p. 826) has studied the effect of certain growth factors on the metabolism and growth of *P. pestis* in culture in media of known chemical composition. Four factors, haematin, cozymase, thiamin and nicotinic acid stimulate respiration and reduce lag in growth. It may be that these substances are essential components of the bacterial cell synthesized during growth but that if they are made readily available, rapid growth is facilitated. WATS and PUDUVAL (p. 827) have obtained smooth and

rough strains of *P. pestis* and have investigated the soluble substance obtained in washings of growth. The presence or absence of this substance has no relation to virulence but its titre seems to indicate the antigenic value of a strain.

In the examination of adult *Mastomys ugandae* the domestic rat of the Lake Albert region DEVIGNAT (p 828) aspirates the bone marrow of the femur suspends it in saline and inoculates young rats. From the results of this investigation, the endemic area has been defined. It is pointed out that apparently healthy rats may show infection.

LEWILLON *et al* (p 828) record a case of meningitis due to *P. pestis*.

SOKHEY and DIKSHIT (p 829) have found that sulphathiazole is much better than sulphapyridine in the treatment of experimental plague in mice and effected cure in 80 to 90 per cent. of animals treated. They propose to try this drug in human cases. MOREAU (p 829) reports recovery of two cases of bubonic plague treated with subcutaneous injections of E.V. serum and the sulphonamide preparation bacteramide by mouth.

GIRARD (p 829) refers to the recurrences of plague which may take place after long periods of freedom from the disease. Epizootics in rats occur in the areas of Madagascar referred to and since destruction of fleas in houses with earth floors and thatch roofs is not possible the author considers that efficient vaccination of the population is the best measure of prevention against plague. GIRARD and RADAODY RALANOST (p 830) show that bacilli of the avirulent E.V. strain may be found in the spleen and liver of guinea-pigs which have received large injections but for a limited period only.

In the Annual Report of the Board of Health of Hawaii (p 830) is a description of the preparation of banana phosphorus bait for rats. AELUNALIA (p 830) states that cyanide preparations are better than trapping or baiting in anti-rat campaigns because they also destroy fleas and they are superior to CO or SO₂. Calced briquettes are more efficient and economical than Cyanogas but need to be used with proper control on account of their dangerous nature. PARAMJOTHY (p 831) found that arsenious oxide and barium carbonate were the cheapest of a number of poison baits tried. He (p 831) states that herd experiments with strains of *Salmonella* and *Pasteurella* have failed to precipitate an epidemic in rats. *Ectromella* is similarly unsuccessful.

JEVION (p 832) describes the services carried out at the plague laboratory in São Paulo.

C IV

HAMPTON (Brock C.) *Plague in the United States.—Public Health Rep* 1940. June 28. Vol 55 No 26. pp 1143-1158. With 1 fig. [15 refs.]

In almost all countries the date of the first introduction of plague is rather ill defined. This seems due to the fact that rat plague has been the first type of infection to occur and that "rat plague may exist in a city for some time without the development of the disease in human beings." Another cause of the inability to give exact dates for the United States was the denial of the existence of plague for months by many intelligent and well meaning but uninformed persons—some of them doctors and health officials—as well as by others whose action was probably based on commercial interests.

The first record of the appearance of plague in the United States falls to San Francisco California on March 6th 1900 with the notification of death of a Chinaman. It was proved plague bacteriologically and by animal inoculation. The world pandemic of plague had begun in the Yunnan province in China 6 years previously. In San Francisco there occurred 121 cases with 113 deaths and the last case of this outbreak was recorded in February 1904. This last case however was not the end of the infection although the epidemic had undoubtedly been brought to an end by vigorous cleansing and anti rat operations human plague was again discovered in San Francisco in May 1907.

During the period 1908-1914 plague appeared in other localities in California with a total of 22 human cases. The history of plague since its introduction on the east coast of the United States has been one of extension and up to January 1st 1940 there have been recorded 499 cases with 314 deaths. The human cases have been reported in eight States. It might be thought that as no more than 8 cases of human plague have been reported from 1930-1939 this disease had become one of trivial importance. This view however would ignore the danger of spread of sylvatic plague. Within 10 years after plague first appeared in San Francisco the infection was proved to be widespread among ground squirrels in nine Californian counties and all the evidence now available goes to show that plague has spread from rats first to the ground squirrels and then to other wild rodents in western United States. It has also been shown that wild rodent plague may spread unnoticed over great areas and may continue to spread unless suppressive measures are adopted to prevent it. This sylvatic plague may be accompanied by little human plague but with its approach to the large rat populations of industrial cities the danger of explosive and epidemic character is greatly increased.

To January 1 1940 plague infection has been demonstrated in 14 species of ground squirrels in red squirrels tree squirrels and flying squirrels in wood rats kangaroo rats field mice prairie dogs chipmunks, marmots and a cottontail rabbit in western United States and in fleas lice and ticks from wild rodents. This article ends on the hopeful note. With full knowledge of how to prevent and control the disease however plague in epidemic form should never again be permitted to occur in any locality in the United States.

W F Harvey

MILLER (Max J.) Plague History and Epidemiology—*Canadian Jl Comp Med* Gardenvale Quebec 1940 July Vol. 4 No 7 pp 183-193 With 1 map

The main part of this article gives an excellent account of the history of plague from earliest times. It also deals with the discovery of the plague bacillus, the extensions and extent of present-day plague and the epidemiology of the disease. So far as concerns Canada the author points out that with gradual extension of sylvatic plague areas in the United States it could only be a matter of time when the wild rodents in western Canada acquired plague infection. Already a "gopher" *Citellus r richardsoni* has been found suffering from plague in Alberta. Unless immediate measures are taken it seems probable that sylvatic plague will spread widely through western Canada.

W F H

SÁNCHEZ VERA (C) La peste en la provincia de Loja Ecuador [Plague in the Province of Loja, Ecuador]—*Bol. Oficina Sanitaria Panamericana* 1940 July Vol. 19 No. 7 pp 661-667

Loja in the southern part of Ecuador where it abuts on Peru, was surveyed in 1939 and found to have been the seat of recurrent epidemics of plague usually preceded by epizootics among rats and guinea-pigs. It seems probable that the reservoir of plague has been the field rodent and that the link between those rodents and man has been the cui (a small rodent of the hamster type. The name is used for *Microcavia australis* and for *Graomys griseoflavus*). Plague infection has been known in the province for 20 years is endemic and is essentially rural. This rural character and comparative absence of any alarming epidemic character is ascribed to the fact that the rat population is found in fields of sugar cane and yuca where food is abundant. There is no necessity for the field rodents to resort to inhabited centres in search of food. Any attempt at eradicating plague from the province of Loja would be extremely difficult and costly. It would be next to impossible to exterminate the cuis. The people are little subject to sanitary control and they live in close community with animals especially pigs and cuis. Roads and means of transport are bad. Some suggestions are made for remedying the state of affairs, which naturally involve the expenditure of government money.

W F H

PIXOTTI (Mário) GENOFFRE (Wernbeck) ROSIEU (L. Barbosa) & VIAXA (Miguelote) Casos de peste em Miguel Pereira [Plague in Miguel Pereira.]—*Arquivos de Higiene* Rio de Janeiro, 1939 Feb Vol 9 No 1 pp 117-165 With 2 folding plans. English summary (9 lines)

The village of Miguel Pereira is in the State of Rio de Janeiro and was attacked by a small epidemic in a population of 797 inhabitants. Almost every detail concerning the sector affected is described, down to the number of particular shops—barbers, carpenters, chemists etc.—and the whole lay-out of the place. Altogether 11 cases of plague occurred with 6 deaths and this epidemic was preceded by a rat epizootic. This epizootic which centred in and around a grocery warehouse was the cause of the first human cases among the employees. In the analysis of all the circumstances the authors conclude that the epizootic was not merely an exacerbation of an enzootic but had been introduced from Rio de Janeiro. Numerous tables and explanatory maps are given and, as is customary with papers in this journal, a summary in English is added on perforated board ready for filing as an abstract.

W F H

OURAS (Jubio D) Consideraciones sobre el problema de la peste en el interior del país [Plague in the Interior of the Argentina.]—*Bol. Sanitario* Buenos Aires 1939 Oct. Vol. 3 No 10 pp 636-639

LAMBORN (W A) Investigations in Connection with an Outbreak of Plague.—*Nyasaland Protectorate Ann. Med. & San. Rep. for Year ending 31st December 1939* Section VIII pp. 27-28.

The investigation was carried out in the neighbourhood of a village in a subdistrict of Blantyre where three human cases had occurred.

Confirmation of the clinical diagnosis was obtained by post mortem examination of a domestic rat. Dethatching of huts and grain stores permitted examination of 275 rodents of the species *Rattus rattus alexandrinus* *Mastomys concha* and one field mouse *Saccostomus campestris*. Some of these were living and some dead. The operations were extended also to fourteen villages within a radius of five miles. An attempt was made to trace the origin of the outbreak and it was discovered that a mild enzootic among field rodents had evidently been in existence for some time over a wide area. Ectoparasites were collected and arrangements were made to enlist the co-operation of headmen and villagers in a survey of the extent of the disease among wild rodents.

W F H

SOKHEY (S S) The Capsule of the Plague Bacillus.—*Jl Path & Bact* 1940 July Vol 51 No 1 pp. 97-103 With 22 figs on 3 plates [17 refs.]

The capsule of a bacillus has attained considerable importance apart from its morphological diagnostic characters, because it is regarded as having antigenic property. In the case of the plague bacillus there seems to have been some tendency to distinguish both a capsule and an envelope and to assign antigenic value to the latter. The author in this paper is solely concerned with an objective study of the capsule but probably the most interesting part of the communication which has to be read in the light of the controversy over the use of broth or agar plague vaccines and incubation at 37°C or 27°C relates to the antigenic values of the plague bacillus in different circumstances. It may be said in the first place that staining with Pitfield's flagellar stain and with Churchman and Emelianoff's stain show the plague bacillus to be definitely a capsulated organism. An organismal capsule is defined as A structure which surrounds the bacterial body is not stained by the ordinary bacteriological dyes but only as a rule by special methods involving the use of mordants sometimes appears as a clear unstained area standing out against a stained background (negative staining) seems to possess a confining membrane and often enlarges on contact with the animal body. Some of the findings of the author bearing on antigenic value of the plague bacillus are —

- 1 The capsule is present whether the organism is virulent or avirulent. The antigenic value of the organism does not seem to make any difference.
- 2 The size of the organism is considerably affected by the temperature and duration of incubation and the medium. The organism as a whole including both soma and capsule is much larger when grown at 37°C. than at 27°C or lower.
- 3 The envelope appears to be nothing but a peculiar settling down of the fine particles of India ink at a distance from the capsule due to the operation of physical forces.

W F H

RAO (M Sadashiva) Oxidations effected by the Plague Bacillus — *Indian Jl Med Res* 1940 Jan. Vol 27 No 3 pp 617-626. With 3 graphs.

The purpose of this research has been to determine the energy sources available for the plague bacillus in nutrient media and the test of that availability has been the rate of oxidation of the substrate by a suspension of the dried organism in normal salt solution. Oxidative

activity was measured manometrically in air at 27°C. and 0.05 M. substrate concentration. Altogether 48 compounds were tested as substrates. Oxidation is indicated and measured by the increased oxygen uptake of the bacteria in the presence of the substrate while "the rate of oxidation has been expressed as the metabolic quotient, that is to say— μ mm. oxygen absorbed by 1 mgm. in 1 hour."

Results are given in some detail. "Oxidative activity towards the pentoses is considerably less than that towards the hexoses. The amino-acids are oxidized at rates which are in general lower than those of carbohydrates. The biologically important organic acids tested are oxidized at rates which are in general higher than those of amino-acids but lower than those of sugars."

One may naturally ask how closely this oxidative activity is correlated with fermentative activity. The correlation should be high and in the case of the plague bacillus a general parallel between them has been demonstrated.

Glucose and lactic acid have been found to be the best and cheapest carbon sources for addition to media. Among the amino-acids only a certain number are of service as nitrogen and energy sources: serine, alanine, proline, cystine, glutamic acid, glycine, phenylalanine, tyrosine and methionine. W. F. H.

Rao (M. Sadashura). Further Studies on the Nutrition of the Plague Bacillus: the Role of Haematin and Other Compounds.—*Indian J. Med. Res.* 1940 Apr Vol 27 No. 4 pp 833-846 [30 refs.]

Knowledge of bacterial nutritional requirements has advanced greatly in recent years and the study of these simple cells has contributed greatly to the elucidation of problems of metabolism generally. A bacterial growth factor says the author "is distinguished from the numerous other compounds that a micro-organism may utilize by the fact that in its absence no growth occurs." The indispensable bacterial growth factor represents already synthesized molecular structure necessary for the nutrition of the organismal cell. There are two types of bacterial growth factors: (1) simpler molecules, such as the amino acids, and (2) more complex molecules such as thiamin, nicotinic acid, etc. The importance of the complex elements is due to the discovery that they are fundamental in cellular respiration. Many of them are identical with animal vitamins, owing their importance to their activity as co-enzymes in enzymatic oxidation systems. The author has already shown (this *Bulletin* 1939 Vol 36 p. 963) that only 3 amino acids—proline, phenylalanine and cystine—are indispensable growth factors for the plague bacillus and that the more complex factors are not essential. The object of the present paper is to show that complex factors may not be indispensable but possess a stimulatory activity on the metabolism and the growth of the organism. As a test of this stimulation observations were made on the ability of a compound added to an amino-acid mixture containing all the factors essential for the growth of the organism to shorten the lag period of growth, or in other words, to initiate an earlier multiplication of the added inoculum over that of the control. Six compounds known to function as growth factors or as coenzymes were used: (1) haematin, identical with the X factor for *H. influenzae* an activity which is associated with peroxidase and catalase activity; (2) cozymase

or diphosphopyridine nucleotide identical probably with the V factor for *H. influenzae* which by being alternately reduced and oxidized serves to carry hydrogen from and to substrate molecules, (3) thiamin or aneurin identical with vitamin B₁, (4) nicotinic acid the anti pellagra vitamin (5) isoalloxazine adenine-dinucleotide and (6) β -alanine. The standard medium used, of known chemical composition contained 12 amino acids its mineral composition was provided from bacterial ash and it was buffered with M/30 phosphate at pH 7.4.

The results of this research were —(1) haematin is highly active in reducing lag in the growth of the plague bacillus while cozymase thiamin and nicotinic acid are somewhat less active. Haematin thiamin and nicotinic acid together have the greatest effect recorded. (2) Haematin cozymase thiamin and orotic acid stimulate the respiration (oxygen uptake) of actively-growing cultures of the bacillus. (3) In a study of the effect of the compounds on the oxidation of a few of the more important substrates by washed suspensions of the organism it has been shown that haematin has no stimulatory effect on any of the oxidations studied but increases the blank O₂-uptake of the suspension. Cozymase stimulates the oxidation of glucose and alanine and the blank O₂-uptake. Thiamin and nicotinic acid stimulate the oxidation of glucose only.

An important suggestion is made that the four growth stimulants—haematin cozymase thiamin and nicotinic acid—may be essential components of the cell being synthesized in the course of growth and that their occurrence and ready availability in the environment will greatly facilitate the rapidity of growth and of invasion of the organism.

II F H

WATS (R. C.) & PUDUVAL (T. K.). A Study of Some Virulent and Avirulent Strains of *Pasteurella pestis*—*Indian Jl Med Res* 1940 Apr Vol 27 No 4 pp 823-831 With 2 plates

In this study of virulent and avirulent strains of plague the subjects dealt with are those of (1) the dissociation forms of the bacillus and its colonies (2) its envelope or soluble substance. Preliminary study with virulent and avirulent strains 120/5H showed that two types of colony were obtained from subcultures on blood agar—uniform small translucent dew-drop-like colonies with a shiny pearl-like appearance—designated as smooth from the virulent strain and large-sized colonies with a pin pricked sometimes rugose surface and irregular broken or serrated margins from the avirulent strain. The smooth colonies were composed of uniform oblong bacilli and the rough colonies of long forms of varying size. No difference was detected in the carbohydrate and protein reactions of virulent and avirulent strains. In broth culture the virulent growth was uniformly turbid while the avirulent one gave a granular deposit at the bottom and sides with a comparatively clear supernatant fluid.

Perhaps the most interesting observations relate to the envelope substance of the bacilli in the form of soluble substance (S.S.) obtained in the washings of growth especially at 37°C. It has been very directly connected with the antigenic value of plague vaccines and with the growth of the organism at 27°C and 37°C respectively. The present authors' findings are —(1) The presence or absence of the S.S. is obviously not dependent on the production of the smooth or rough colonies of a strain but as a general rule it may be stated

that a strain producing majority of rough colonies is likely to be poor in the S.S. value (2) the presence or absence of the S.S. has no relation to the virulence or non virulence of the strains studied" (3) the titre of the soluble substance seems to indicate the antigenic value of a strain
W F H

DEVIGNAT (R.) Diagnostic collectif de la peste murine par la récolte collective des moelles fémorales de rats en eau physiologique et l'inoculation au cobaye de l'émulsion ainsi obtenue. [Rat Plague Diagnosed by Pooled Marrow Inoculation of Guinea-pigs].—Ann Soc Belge de Méd Trop 1940 Mar 31 Vol. 20 No 1 pp 41-50

Instead of making cultures of bone marrow the method of subcutaneous inoculation has been adopted and this has rendered it possible to examine 287,862 adult *Mastomys* *scandus* since January 1937. The *Mastomys* is the domestic rat of the Lake Albert region. The procedure is simple and consists in cutting across the leg, just above the knee, plunging a short-bevel needle into the exposed marrow aspirating and then suspending by aspiration and re-aspiration the tissue obtained in 5 cc. sterile physiological salt solution. Young *Mastomys* rats are rejected. Deratization squads tour their districts once a month visiting all huts and inoculating daily one guinea-pig with the bone marrow from the morning's catch of rodents. The same procedure may be adopted for sylvatic species or if bone marrow cannot be procured, spleens are used and are rubbed into the shaved skin of a guinea-pig one by one. With this procedure 21 strains of rat plague bacilli were obtained and the plague endemic area of Lake Albert has been defined. Some rats apparently healthy were found plague-infected in villages where no human cases of plague had been reported. Those people who had been vaccinated against plague remained free of the disease
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LEWELLYN (R.) DEVIGNAT (R.) & SCHROETTER (M.) Un cas de méningite pesteuse primitive. [A Case of Primary Plague Meningitis].—Ann Soc Belge de Méd Trop 1940 Mar 31 Vol. 20 No 1 pp 79-82.

A child of nine years was admitted to hospital with a temperature of 37°C and symptoms of meningitis on the 4th day of illness. Malaria was excluded. The cerebrospinal fluid was purulent but showed no organisms microscopically. The fluid was sown on aseptic agar and blood agar and isolated colonies, which proved to be plague, grew on the former medium. The child died on the 8th day. Puncture tissue obtained from the heart, liver and lungs, rubbed on the shaven guinea-pig did not produce plague infection. The conclusion drawn is that the plague infection had not extended beyond the meninges.
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SORREY (S. S.) & DINESH (B. B.) Sulphathiazole in Bubonic Plague.—Lancet. 1940 June 8 pp 1040-1042. [12 refs.]

The highly standardized methods which have been worked out in the Haflkine laboratory Bombay render experiments easy to set up for the trial of any new form of plague therapy. These experiments

give a clear picture of the relative merits of sulphathiazole and sulphapyridine. Mice bred in the laboratory 2½ to 4 months old and 21-30 gm. weight were used with a strain of *P. pestis* which on subcutaneous injection of 6-12 organisms produced a mortality in the mice of not less than 80 per cent. The drugs were introduced into the stomach in dosages from 10 mgm a day to 40 mgm twice a day for 10 days and in these experiments were given either (1) at the same time as the infection or (2) 24 48 72 hours after infection. This series may be divided into two groups (1) before septicaemia has occurred which includes the administration of the test drug at the same time and 24 hours after infection and (2) 48 hours and 72 hours after infection by which time septicaemia is invariable in these mice. In the first of these groups that is before septicaemia had set in as small a dose of sulphathiazole as 10 mgm. a day twice a day for 10 days saved nearly 80 per cent. of the infected animals. In the second group of septicaemic animals a dose of 40 mgm twice a day for ten days cures 80-90 per cent of infected mice. It is shown in these experiments that sulphathiazole is much superior to sulphapyridine in plague and as plague is much more severe in the mouse than in man they hold out a prospect of great advance in the therapy of plague. The authors propose to try out sulphathiazole in the field soon.

IV F H

MOREAU (P) Deux cas de peste bubonique traités par l'association sérothérapie E V et bactéramide per os [Successful Treatment of Plague by E.V Serum and Bacteramide]—*Bull Soc Path Exot* 1940 Apr 10 Vol 33 No 4 pp 289-292.

Two cases of bubonic plague were proved bacteriologically, and were treated by subcutaneous injection of E V serum and the sulphonamide preparation bacteramide by the mouth. One patient received a total of 250 cc serum in 3 days and 26 half-gramme tablets of bacteramide in 9 days the other 260 cc serum in 3 days and 32 tablets in 10 days. Both patients recovered.

IV F H

GIRARD (G) Foyers persistants de peste murine à Tananarive [Persistent Foci of Rat Plague in Antananarivo]—*Bull Soc Path Exot* 1940 Mar 13 Vol 33 No 3 pp 209-211

The subject of this article is the duration of rat plague in restricted areas and the recurrence of active plague in those areas for several years. One example of such persistence of infection occurred on an estate in the country near Antananarivo where a native died of plague in 1927. There was a high mortality among rats at the time. Again in 1932 a child died of plague and again there was an epizootic among rats and mice. In 1934 there was an epizootic without human cases and lastly in 1939 news was brought of dying rats. This mortality in rats was proved to be due to plague by the inoculation into guinea-pig and mouse of *X. cheopis* fleas from the dust of the habitations in which dead rats had been found. Other examples are given. The destruction of fleas in huts where the floor is of beaten earth and the roof of thatch is not a practical proposition. From this the deduction is made that efficient vaccination of the population is the best measure for its protection against plague.

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W F H

GIRARD (G) & RADADDI RALAROSY (P) Sort de deux souches de bacilles pesteux atténués inoculées au cobaye par voie sous-cutanée [Fate of Two Strains of Attenuated Plague Bacilli Injected Subcutaneously]—*C. R. Soc Biol* 1940 Vol. 133, No. 4 pp. 580-582

These experiments were designed to determine how long the living bacilli of the avirulent E. V. strain of the plague bacillus, which is used for vaccination, remained alive in the body of the guinea pig and in what organs after subcutaneous injection. A suspension of the organism in dose of 1 000 million was injected 24 hours after preparation. Plague bacilli could only be demonstrated in the blood about 40 hours later and were absent beyond the 2nd day. The spleen was the first of the organs to show invasion towards the 4th day and not beyond the 11th day. The invasion of the liver was somewhat later but here bacilli persisted for some 13 days. They were only once found in a lymph node and never in the bone marrow while they were not isolated in culture from the lungs because of overgrowth of associated organisms.

A similar experiment with the avirulent strain Pecha which is non-vaccinating, showed that it does not appear in the blood at all nor in any of the organs. W F H

HAWAII TERRITORY OF ANNUAL REPORT OF BOARD OF HEALTH FOR FISCAL YEAR ENDED JUNE 30 1939 pp 209-236 With 9 graphs—Plague Campaign, Territory of Hawaii.

This report or series of reports, is presented by a series of officials and is mainly an administrative record with tables and graphs. It follows the same lines as the report of the previous year [see this Bulletin 1939 Vol 36 p 973]. The description of the preparation of banana-phosphorus bait is as follows—The phosphorus banana bait is made by cutting a half ripe banana into segments $1\frac{1}{2}$ inches in length. Then each segment is cut in half leaving the skin and part of the flesh to act as a hinge and two holes are then cut in each half of the segment. Into each of these holes is placed a small amount of phosphorus paste. The two sides of the banana segment are then joined to enclose the phosphorus paste and a tooth pick is inserted into the banana segment at an angle to prevent it from splitting open. The bait when made with half-ripe bananas lasts on an average 45 days under field conditions. H F H

ARLENHALL (C L) Role of Calcid Fumigation as a Ratkidal and Pubicidal Measure in Anti-Plague Campaign.—*Indian Vet Gaz* 1940 Apr Vol 75 No 4 pp 219-222 With 2 figs

Cyanide preparations are superior to trapping and baiting operations in the anti-rat plague campaign because they bring about the death not only of rats but also of the equally dangerous fleas. Fumigants such as carbon monoxide and sulphur dioxide gas seem to be less effective or less convenient than cyanide products. The author has tested the activity of calcium cyanide preparations by means of an artificial rat burrow which permits of a full view of the fumigation operations and, therefore, allows the collection of data on the subject. Two preparations were tested (1) Cyanogas A dust, and (2) Calcid briquettes. The experiments are claimed to show that Calcid is much

more efficient and economical than cyanogas. Thus 6 gm Calcid are at least as efficient as 60 grammes of cyanogas dust. The hydrocyanic acid content of Calcid however is only twice that of Cyanogas and it is probable that the greater efficiency of the former is in part due to the type of blower used which is a combined grinder and blower. It is easy to keep the Calcid when not being used in its briquette form and it is a much less expensive preparation than Cyanogas powder because of its greater efficiency. The author concludes with the remarks — On account of the dangerous nature of the preparation calcid has not yet been taken up for use on an extensive scale in many parts of India. With proper control and under trained supervision there is no danger of any kind in operating this valuable product in inhabited areas. In 1935 the number of houses fumigated and number of rat holes closed were 66 357 and 881,974 respectively.

W F H

FEDERATED MALAY STATES ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1938 — Rat Virus Enquiry pp 140-144 [PARANJOTHY (J T)]

Certain bacteria develop powerful exotoxins. Some of these toxins were administered by stomach tube to rats but little evidence of toxæmia was shown in the case of *Bact dysenteriae* Shiga toxin toxin of *S enteritidis* Liverpool and *Cl botulinum* toxin even in rather large dose. Non-commercial chemical poison baits recommended by the Department of Agriculture were also experimented with. It was found that with the four which were used thallium sulphate sodium arsenite arsenious oxide and barium carbonate of concentrations in the bait 0.4 10 2 and 20 per cent respectively the total deaths out of 45 rats were 22 31 31 and 37 respectively. Rats had to be starved for one or two days before they would ingest completely the doses of bait supplied. The cost per fatal dose (including labour) of these four mentioned poisons was 0.14 0.054 0.052 and 0.004 cent which would make arsenic and barium carbonate the cheapest of the various poison baits used. A dose of 2 gm poison proved fatal.

W F H

PARANJOTHY (J T) Rat Virus Enquiry Report including a Note on the Ratifidal Value of Certain Commercial and Other Chemical Poisons.—*Bull Inst Med Res Federated Malay States* 1939 No 1 23 pp

The plague of the rat is one of medical industrial and agricultural importance and much annual loss to the community is caused by the depredations and transmitted infections of this rodent. An enquiry of wide scope has been conducted by the author into means especially of rat virus and poison type to cope with this menace. Herd experiments have been undertaken to assess the value of viruses and in some of them a high mortality among rats has been attained. Nevertheless it would seem that the herd experiments performed with accredited strains of *Salmonella* and *Pasteurella* have failed in their object of precipitating an epidemic among the rat population. This is the real measure of their effectiveness and it appears that they have been ineffective. It has been the same with *Ectromelia virus* which is a filterable virus and pathogenic to mice.

Rats may indirectly be the cause of much sickness among the labour populations of Malayan estates and are the recognized reservoirs of such diseases, for example as tropical typhus, leptospirosis, meloidosis and plague. With this in view a considerable number of dead rats were examined for infections—rats either found dead or sacrificed in the experiments performed. Out of 74 dead rats found there was no obvious cause of death in 45 pulmonary abscesses like those of meloidosis were found in 17 but *Pf whitmori* was not isolated although other organisms were grown in culture and helminthic ova and larvae resembling *Strongyloides ratti* were found. Other findings in the blood of sacrificed rats were *Trypanosoma lewisi* *Barlonella muris ratti* and *Spirillum minus*.

Lastly the ratcidal value of certain commercial viruses and chemical poisons was tested—Liverpool virus new Liverpool virus raxon ratinum ratin vexterm rat biscuits phosphorus paste ratbane and certain recommended formulae for baits. W F H

D. AMATO (Hugo J.) Lucha contra la rata. (The Struggle against the Rat.)—*Bolet Sanitario*, Buenos Aires, 1939 June Vol. 3 No. 6, pp 439-442.

JUNIOR (Favorino Prado) O serviço de laboratorio na prophylaxia da peste. [Laboratory Procedure in the Prophylaxis of Plague.]—*Brasil Medico* 1940 Jan. 27 Vol. 54 No. 4 pp 49-55 With 6 figs

Plague infection has remained a constant menace in São Paulo after many years of sanitary measures. The necessity of a plague laboratory has fully established itself and an account is given here of the detail and the diagnosis of plague infection in rats, the determination of the various indices in connexion with plague and the biological data regarding rats which are so important in estimating the probabilities of plague epidemic. Month by month the data are recorded of the species of rats (*R. norvegicus* *R. rattus* *M. musculus*) numbers of males and females, numbers pregnant numbers of foetuses, and numbers infected with plague. Care is taken over the separation of *P. pestis* infection from that of *P. pseudotuberculosis rodentium*. The plague bacillus ferments glycogen and is non-motile while the other ferments rhamnose and is motile. W F H

BLACKWATER FEVER.

PRÉCIS OF ABSTRACTS IN THIS SECTION

By injecting haemoglobin intravenously into man, FAIRLEY (p 833) has found that the renal threshold is between 37 and 102 mgm. per 100 cc. in amounts greater than these haemoglobinuria was produced, but methaemalbumin could not be detected in the plasma. Increase of bilirubinaemia was found in two of the three subjects. Methaemalbumin was, however produced in the plasma of patients who received incompatible blood and it is suggested that haemoglobin disintegrating in the circulation is split into globin and haematin (ferrous) the

latter being immediately oxidized to haematin (ferric) which combines with serum albumin to form methaemalbumin. Otherwise extra corpuscular haemoglobin may be excreted by the kidneys or absorbed by the R.E. system with the production of bilirubin and haemosiderin.

FAIRLEY and MURGATROYD (p 834) report a case of malaria in which the administration of quinine constantly produced mild attacks of blackwater fever. The patient was infected with both *P. falciparum* and *P. vivax*. Later when the malaria was apparently cured quinine entirely failed to produce haemoglobinuria and there was no evidence of cutaneous sensitivity to quinine. Methaemalbumin was constantly found in the plasma during the attacks of blackwater.

GOTTEN and MACGOWAN (p 836) report a case of blackwater fever caused by the bite of a spider in America. The patient was a child of 3 who recovered after blood transfusion and injection of 10 per cent. dextrose solution.

CHO (p 836) describes a case in which death followed the onset of anuria.

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MEASHAM (p 837) writes of the value of *Vitex peduncularis* in the treatment of blackwater fever. CIAVALDINI (p 837) uses daily intravenous isotonic saline to which quinine and horse serum are added. Details of the method and of the additional measures are given.

C IV

FAIRLEY (N. Hamilton). The Fate of Extracorporeal Circulating Haemoglobin.—*Brit Med J* 1940 Aug 17 pp 213-217 With 1 graph. [13 refs.]

In this paper the author describes certain observations which throw some light on the fate of extracorporeal circulating haemoglobin. The biological relationship of haemoglobin to bilirubin and its subsequent excretion as bile pigment have been established, but the relationship between haemoglobin and haematin is less well understood.

DUESBERG in an attempt to explain the significance of haematin as revealed by Schumm's test in the serum of cases of pernicious anaemia injected haemoglobin as well as haematin solutions intravenously into man. He found that after the injection of 3 to 6 gm. of haemoglobin intravenously Schumm's test was negative except in patients with certain diseases of the liver. As these results are not in conformity with certain recent biochemical findings in the haemoglobinurias and haemolytic anaemias Fairley decided to repeat Duesberg's experiments injecting larger quantities of haemoglobin and making quantitative determinations of the resulting haemoglobinaemia as well as serial van den Bergh and Schumm tests.

The technique employed in making Schumm's test was as follows —

A given volume of plasma was covered with a layer of ether one-tenth the volume of concentrated ammonium sulphide (analar) was then run in with a pipette and subsequently mixed by shaking. A positive reaction is indicated by the appearance of a haemochromogen with a sharply defined α band at 558 $m\mu$ in a depth up to 4 cm. of plasma. The presence of much haemoglobin adds to the difficulty of performing the test, since reduced haemoglobin is formed which obscures the haemochromogen bands."

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Fairley injected haemoglobin solution into three patients the amount given varying from 180 mgm. to 350 mgm. per kilo. The maximal

concentration of haemoglobin at the end of the injections varied from 208 to 230 mgm per 100 cc. The fall in haemoglobinaemia titre was rapid, but it persisted in sufficient concentration to give rise to haemoglobinuria lasting from 7 to 18 hours. The quantity of haemoglobin present in the plasma at the termination of the haemoglobinuria varied from 37 to 69 mgm. The renal threshold for haemoglobin lay somewhere between 37 and 102 mgm per 100 cc.

The bilirubin estimations were not considered satisfactory owing to technical difficulties but quite definite and sustained increases were observed in two cases.

In contradistinction to Duesberg's findings, the plasma of all three cases gave a positive Schumm's reaction within 4 to 10 hours, and the reaction persisted for 27 to 34 hours. In all three cases the plasma was examined with a reversion spectroscope for the presence of methaemalbumin, with negative results.

The author next records certain observations made on two cases of incompatible transfusion and on man and monkeys after intravenous injection of alkaline haematin (ferroc).

The following summary is given —

Following the intravenous injection of 14 to 25.4 grammes of human haemoglobin in man a positive Schumm reaction was invariably demonstrated in the plasma within four to ten hours, and persisted for twenty-four hours or longer.

A transient increase in bilirubin was also noted in the plasma in two of the three cases receiving haemoglobin injections.

Though methaemalbumin was not found spectroscopically following the injection of haemoglobin in these amounts, it was demonstrated in the plasma of two patients who received by mistake incompatible blood containing approximately 45 and 90 grammes of haemoglobin respectively.

In incompatible transfusion and the other intravascular haemolyses in man, methaemalbumin and not methaemoglobin is found in the plasma; a mixture of the two pigments has never been recorded *in vivo* though they do occur together *in vitro* when a human plasma-haemoglobin mixture is incubated at 37°C.

Extracorporeal circulating haemoglobin may be (a) excreted by the kidney (b) absorbed by the R. E. cells with the production of bilirubin and haemosiderin, and (c) katabolized in the circulation with the production of methaemalbumin.

It is suggested that haemoglobin disintegrating in the circulation is first split into globin and reduced haematin (ferrous) the latter pigment is immediately oxidized to haematin (ferric) which in man combines with serum albumin to form methaemalbumin." W. Yorks.

FAIRLEY (N. Hamilton) & MURGATROYD (F.) Recurrent Blackwater Fever induced by Quinine.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940 Aug. 16. Vol. 34 No. 2 pp. 187-194. With 1 chart.

The authors state that although the close correlation between the administration of quinine to malarial patients and the onset of blackwater fever has long been recognized, it is not often that a malarial patient is found in whom the attacks of haemoglobinuria induced by quinine are sufficiently mild and sufficiently frequent to enable an investigation to be undertaken both during and between the paroxysms of intravascular haemolysis which constitute the fundamental basis of blackwater fever.

The present note deals with such a case. The patient a woman aged 49 was admitted to hospital on the 2nd June 1939 with fever which

had developed three days previously. Her blood contained *P. vivax* and *P. falciparum*. The patient had lived in India and Assam for 20 years and had suffered from recurrent attacks of malaria from 1921 to 1930 but subsequently had been entirely free from fever until three days before admission to hospital. On admission the red cell count was 4 400 000 and the haemoglobin value 86 per cent. The urine contained only a trace of urobilin.

The patient was given quinine bihydrochloride 10 grs. thrice daily commencing on the 3rd June. This treatment was continued during the next day but at 6 p.m. the patient developed mild blackwater. She had a temperature of 103°F. the urine was dark brown in colour and contained oxyhaemoglobin and some methaemoglobin. Anti-malarial treatment was stopped and a mixture containing potassium citrate and sodium bicarbonate was given. The following day the red cell count was 3 600 000 and the haemoglobin value 76 per cent. There was a positive indirect van den Bergh reaction. methaemalbumin was demonstrable spectroscopically but only in very thick layers of plasma. No parasites were found in the blood.

After an interval of two days during which the temperature was normal quinine bihydrochloride was given in progressively increasing dosage from 1½ grs. on the 7th June to 30 grs. on the 12th and 13th.

On the 10th June the patient felt unwell. The next evening she had a temperature of 100°F. and the following evening a temperature of 101.4°F. The blood was negative. On the following day (13th June) she had transient haemoglobinuria and antimalarial treatment was stopped. The next day the patient was icteric the red cell count was 3 000 000 and the haemoglobin value 70 per cent. The temperature had returned to normal and remained so for 38 days.

Antimalarial treatment was recommenced on the 23rd June when plasmoquine 0.01 gm. was administered thrice daily for 5 days without haemoglobinuria developing. On the 17th July it was decided to ascertain whether quinine could now be given without inducing haemoglobinuria and quinine bihydrochloride 5 grs. was given three times without apparent effect except that the patient did not feel quite as well as usual. Schumm's test for haematin which was negative before became positive the day after the quinine was administered. No quinine was given on the 18th and 19th July but on the 20th quinine bihydrochloride 10 grs. was given at 11 a.m. and 2 p.m. The patient complained of deafness at 3 p.m. and at 5.30 p.m. passed dark red urine. The temperature that evening was 101.4°F. The next day the urine cleared.

On the following day (22nd July) quinine bihydrochloride 10 grs. was given at 4 a.m. and noon. By 4 p.m. the patient was complaining of slight deafness and shivering and passed 1½ ounces of dark brown urine containing blood pigment. the temperature was 101°F. Various examinations of the blood were made before and during these attacks.

The following are the conclusions —

(1) The laboratory and clinical data recorded refer to a malarial patient studied during recurrent attacks of mild blackwater fever induced by quinine.

(2) No evidence of dermal hypersensitivity to quinine was found.

(3) The capacity of quinine to produce blackwater fever appeared in this case to be directly or indirectly related to persisting malarial infection.

(4) Several months after apparent cure of the malaria quinine therapy entirely failed to induce haemoglobinuria.

- " (5) During and following the bouts of haemoglobinuria methaemoglobin was invariably demonstrated in the plasma either spectroscopically or by means of Schumm's test.
- " (6) Prehaemolytic swelling of the corpuscles associated with spherocytes and probably increased fragility to hypotonic saline solution were observed.
- " (7) The findings suggest that the lytic agent acts directly on the circulating corpuscles, and are compatible with the view that a toxic enzyme or biological haemolysin was implicated.

GOTTEA (Henri B) & MACGOWAN (J J) Blackwater Fever
(Haemoglobinuria) caused by Spider Bites.—*J Amer Med Assoc*
1940 Apr 20 Vol 114, No 18 p 1547

In this note the authors record a case of blackwater fever caused by a spider bite. The spider was probably *Amurobius ferox*. The patient was a girl, aged 3 whose family lived in a rural community. The child was bitten on the left flank by a large brown spider. At the time she was seen by the authors she had a temperature of 102°F and was vomiting frequently. There was a large swollen indurated area on the left side just above the buttock, where the spider had punctured the skin. The child did not at the time appear to be extremely ill. The following morning, however, she passed blackwater. The pigment was identified as methaemoglobin, and was present in concentrated amounts. The temperature was still 102°F, the red cell count was 2,940,000 and the haemoglobin level 59 per cent. The leucocyte count was 17,800 with 91 per cent polymorphonuclear leucocytes and 8 per cent small lymphocytes and 1 per cent large mononuclears. The next morning the colour of the urine had improved, the vomiting had ceased, and the patient was able to take some fluids. During the afternoon approximately 72 hours after the bite the child suddenly collapsed. The temperature was 104°F, the pulse rate 160 and the volume very poor and the respiration 36. She perspired profusely and became cyanotic. Transfusion of 300 cc of citrated blood was administered, and this was followed by an injection of 300 cc of 10 per cent dextrose. The following morning the temperature was normal and the general condition greatly improved. Convalescence was rapid. II 1

CHO (Ryoten) Ein Fall von Anurie infolge des Schwarzwasserfiebers.
[Anuria resulting from Blackwater Fever].—*Tsushin Igaku Zasshi*
(*J Med Assoc Formosa*). 1940 July Vol 39 No. 7 [In Japanese pp 973-977 German summary p 978]

The onset of anuria in blackwater fever is a sign of grave prognostic importance and death usually follows. The author records such a case in a Japanese aged 63 who had for 20 years lived in a malarious part of Formosa, but who gave no history of malaria until the present attack, which took the form of tertian fever for which he was given quinine. On the third day there was diminution of the flow of urine and the urine was dark brown in colour. The diagnosis of blackwater fever was made and three days later there was anuria. Examination showed severe anaemia with jaundice, weak and rapid pulse and cardiac murmurs and a spleen just palpable. Erythrocytes numbered

1,160 000 leucocytes 22,300 haemoglobin 40 per cent no malaria parasites were found

Intravenous injection of 5 per cent sodium bicarbonate was given and 40 per cent urotropin solution was administered the patient died.
C W

PERRIS (Emmanuel P) Ein seltener Fall von Schwarzwasserfieber [A Rare Case of Blackwater Fever]—*Arch f Schiffs u Trop Hyg* 1939 Sept Vol 43 No 9 pp 411-416 [16 refs]

This note gives in great detail the clinical history of a case of blackwater fever which in the author's opinion presented certain unusual features.

The patient who had for some time suffered from malaria was an alcoholic. The history records that he had an attack of malaria in August 1936 and was treated by several courses of atebryn quinine and plasmoquine. He was reinfectd the following May and again treated with a combination of these drugs.

On the 17th August 1937 the patient turned up again with malaria and was given an intramuscular injection of 1 gm of quinine and told to continue with the usual atebryn quinine and plasmoquine course. A few hours later however he had a rigor and passed blackwater. The clinical history of the case from this point until 28th August when convalescence definitely set in is given day by day.

To the reviewer there is nothing unusual about the case apart from the treatment which was in truth manifold and varied. The case appears to belong to that group characterized by a long series of relatively mild haemolytic attacks. Such cases were recorded by BARRATT and YORKE (1909) and have frequently been reported since
W Y

MEASHAM (J E) *Vitex peduncularis* in the Treatment of Blackwater Fever—*Indian Med. Gaz* 1940 Jan Vol 75 No 1 pp 25-28

The author has tested *Vitex peduncularis* in the treatment of black water fever. He administered the drug to a series of eleven cases which occurred in the Anamallai Hills of the South Western Ghats between 1936 and 1939. Brief details of the cases are summarized in a table from which it appears that ten patients recovered and one died. The author concludes that the drug is of definite value in blackwater fever and adds that he hopes further clinical and pharmacological observations will be made by other workers. [It is hardly necessary to add that much more evidence must be obtained before one is warranted in drawing any such conclusion. References to this drug may be found in this *Bulletin* 1921 Vol. 17 p 306 and 1924 Vol. 21 p 604. In the latter paper CHOPRA KNOWLES and GUPTA found that it had no effect in malaria.]
W Y

CIAVALDINI L'hémoglobinnurie paludéenne [Malarial Haemoglobinuria.]—*Rev du Paludisme et de Méd Trop* Paris. 1940 Mar 15 Vol. 2. No 9 pp 65-67

During 30 years practice in Algeria the author has been called upon to treat 41 cases of malarial haemoglobinuria. As the result of this experience he has adopted certain lines of treatment which he describes

The basis of the treatment is the intravenous injection of isotonic saline, 250 to 500 cc a day until the urine becomes normal. On the first three days 150 gm of bithydrochloride of quinine is given for a week after which its administration is repeated if necessary. To the second 125 cc of saline injected. Liver symptoms are relieved by intestinal irrigation with cold boiled water a quarter of a half of the saline injection is added 10 to 20 cc of horse serum with the idea of increasing the rate of blood coagulation. Diuretic hot or cold drinks are given alkaline water and 50 gm of lactose a day may be added with profit. To combat cardiac collapse injections of ether caffeine or sparteine camphorated oil, or adrenalin are useful.

Norman H. Ait

FEVERS OF THE TYPHUS GROUP AND OTHER FEVERS.

Prices of Abstracts in this Section

Louse and flea-borne—In Bombay PATEL (p 840) reports seven cases in which typhoid was suspected, but in which the Weil-Felix reaction with *Proteus OX19* was positive with negative Widal and blood culture.

SILAKHA (p 840) similarly reports on the results of Weil-Felix reactions performed on patients with fever but negative to tests for typhoid in Bangalore. Fifty-six positive Weil-Felix reactions were found in 3 years the majority being positive for *Proteus OX19*. The vector of the disease is thought to be the rat flea.

MITCHELL (p 841) records an increase in the number of cases of endemic typhus in Louisiana. Prevention lies in the control of rats.

PONS (p 841) reports endemic typhus in Porto Rico. In Constantinople (ELLIS (p 841) describes cases of typhus which differ from epidemic typhus and boutonneuse fever. All gave strong reactions with *Proteus OX19* and considerably weaker reactions with *Proteus OX19* and all lived in rat-infested dwellings.

From work on guinea pigs and on human contacts of cases of typhus OVALLE SÁNCHEZ (p 841) concludes that the injection of serum from convalescent patients is a harmless procedure and has some effect in preventing the disease but that its activity is small if given towards the end of the period of incubation. The serum used originally gave a Weil-Felix reaction at 1/640 titre but was concentrated, through a collodion sac until the titre reached 1/15 000.

BONNOLIS and BOSTOX (p 842) discuss the epidemiology and control of endemic typhus in Georgia, U.S.A. Control is largely a matter of rat extermination or exclusion.

BOSTON (p 842) shows that the control of murine typhus in America is a public health engineering problem, and indicates the principles of rat extermination and exclusion from buildings.

Tick-borne—Although strains of Rocky Mountain fever virus isolated in the Eastern United States have hitherto been less virulent for guinea pigs than those isolated in the West TORRINO and DYER (p 843) now report a highly virulent strain recently isolated in Washington and give details of its effects on guinea pigs.

HOLLAND (p. 843) gives information concerning *Dermacentor andersoni* in Alberta where it is thought to be extending. Ground squirrels and hares are probably the hosts for larvae and nymphs but domestic stock are the principal hosts of the adults. Open dry country is less infested than small deep valleys since the ticks are sensitive to low humidity. Ticks were found on low bushes and various grasses. ROBERTS (p. 844) gives instructions as to the elimination of *Rhipicephalus sanguineus* from dogs and their kennels in Australia. Derris powder or wash should be used for the animals and kennels should be carefully sprayed with creosote or crude oil and old bedding should be burned or boiled. [Although this tick has not been associated with human disease in Australia it is a vector of boutonneuse fever in France and has been suspected in India.]

FLORMAN and HATKENSCHIEL (p. 845) note a marked reduction in the number of blood platelets in a case of Rocky Mountain fever.

Mite-borne—KOUWENAAR (p. 846) gives a detailed description of the pathological appearances found in Sumatran mite fever and in scrub typhus. These appearances are the same in both diseases. They differ from those of classical typhus and endemic typhus in that the chief change is a perivascular infiltration only secondarily attacking the intima whilst in the classical and endemic forms the primary lesion is destruction of the intima and media followed by perivascular infiltration. LEWTHWAITE and SAVOOR (p. 847) quote the findings on which they base their conclusion that Sumatran mite fever is not a disease *in generis* but is identical with tsutsugamushi fever.

LEWTHWAITE (p. 847) has again isolated a virus identical with stock *Proteus OXA* strains but which was obtained from a guinea pig infected with strain E originally a *Proteus OX10* strain obtained from rats caught on an estate where tsutsugamushi fever was present. Details of the findings are given.

Vaccination—MURGATROYD (p. 848) has summarized present knowledge of immunization against human rickettsial diseases. In discussion of this paper FINDLAY points out that in N. Africa the natives possess a certain degree of inherited or acquired immunity and that the reactions to vaccination are slight but that in Europeans living vaccines of the murine type give rise to severe reactions. Killed vaccines confer a certain amount of immunity.

DURAND and SPARROW (p. 849) show that if the viruses of typhus and boutonneuse fever are administered to mice by the nasal route there results haemorrhagic pneumonia in which large numbers of *Rickettsia* are found. DURAND *et al.* (p. 849) also found that the virus of Rocky Mountain fever inoculated by the nasal route in mice, rabbits and squirrels gave haemorrhagic pneumonia rich in *Rickettsia*. DURAND and GIROUD (p. 849) have used *Rickettsiae* from the lungs of infected mice emulsified in formalin as a vaccine in guinea pigs with success. In man and monkeys inoculations of this vaccine produced positive Weil Felix reactions. They (p. 850) obtained success with a similar vaccine of Rocky Mountain fever virus in experiments with guinea pigs.

SPARROW and MAKESCHAL (p. 850) infected men with a murine virus contained in the intestines of inoculated lice by instillation of an emulsion into the conjunctival sac. Mild fever resulted but no virus could be found in the blood. The men were later found to be immune to inoculations of classical and murine typhus.

LAIGRET (p. 850) has experimented with a method of vaccination against typhus by application of a vaccine to the scarified skin.

Other fevers.—DEURICK and SMITH (p. 851) have found a bandicoot *Isodon torosus* naturally infected with the virus of Q fever in Australia. *Haemaphysalis kumkoma* is known to be a natural vector of this disease in animals and SMITH (p. 851) has investigated its importance in producing infection in man. The faeces of infected ticks are highly infective and are capable of infecting guinea-pigs even through the unbraded skin. This would appear to be the natural mode of infection of vertebates and the infection of abattoir workers may be attributed to this.

COX (p. 852) sums up recent information on *Rickettsia dyphoriae* and the disease caused by it which it is proposed to name American Q fever on the grounds that it is identical with Australian Q fever.

HERTIG (p. 853) has cultivated *Bartonella bacilliformis* on semi-solid Naguchi leptospira medium.

SLAYTER (p. 853) describes an outbreak of three-day fever in New Caledonia.

SHORTT *et al.* (p. 853) show that monkeys are susceptible to infection with the virus of sandfly fever and that the virus can be passaged through mice. Neutralizing bodies can be demonstrated. In man the virus can be recovered up to 3 or 4 weeks after the onset of fever and can be cultured on the chorio-allantoic membrane of the fowl embryo. The cultured virus used as a vaccine appeared to produce some degree of immunity in man.

C. B.

PAYEL (T. B.) Typhus Fever in Bombay.—*Indian Med Gaz.* 1940 Apr. Vol. 75 No. 4 pp. 228-230.

In the Fever Hospital cases which had been admitted as possibly typhoid and which gave negative Widal reactions and blood cultures were tested for the Weil-Felix reaction. Seven of these gave positive reactions with *Proteus OX19* and are described in the paper; all recovered.

D. Barry

SHARMA (L. R.) "Non-Epidemic Typhus" Fever in the Civil Population of Bangalore (Civil and Military Station).—*Indian Med Gaz.* 1940 Jun. Vol. 75 No. 7 pp. 398-401. With 2 charts. 10 refs.

In the 9 years 1936, 1937 and 1938 all cases of fever which had not given a positive Widal reaction or a positive blood culture were also tested for the Weil-Felix reaction. As a result some 56 cases with positive reactions were found. 50 for *Proteus OX19*, 5 with *OX2* and one an unreported case for *OXK*. In the majority of the cases the fever lasted for 10 to 18 days and typical rashes were seen in 12 cases; all the patients recovered.

The vector of endemic typhus in Bangalore has not been determined, but the majority of the cases occurred among poor people in the city and therefore the rat flea is probably responsible. In one case however there was a history of tick bite when the patient was on a picnic party in the jungle.

D. B.

MUSSER (J. H.) Typhus Fever in Louisiana—*New Orleans Med & Surg J* 1940 July Vol. 93 No. 1 pp. 39-42.

Cases were first reported in the State in 1929 and 115 cases were notified in 1939.

The typhus is entirely of the endemic type. It is noted that this disease is a disease of the Southern States and the reasons given for this are the milder climate, the fact that houses are not strongly built and are not rat proof and that ample food supply is readily available for rats.

Prevention lies in control of rats.

D. H.

EVANS (Earl F.) Endemic Typhus of the Southeastern States—*U.S. Nav. Med. Bull.* 1940 Apr. Vol. 38 No. 2 pp. 210-218 [16 refs.]

A general survey of the epidemiology and clinical aspects of the disease with descriptions of two cases seen by the author.

D. H.

PONS (Juan A.) Is there Brill's Disease in Puerto Rico?—*Bol. Asoc. Med. de Puerto Rico* 1940 June Vol. 32 No. 6 pp. 196-201.

The term Brill's disease is used in this paper as a synonym for endemic typhus and the answer to the query in the title is in the affirmative.

Eight cases are described, 3 of which gave a strongly positive Weil-Felix reaction and in 6 a typical rash was present.

D. H.

CELIA (O. Seresfettin) Quelques cas atypiques de fièvre exanthématique à Istanbul. [Some Atypical Cases of Typhus Fever in Constantinople]—*Bull. Soc. Path. Exot.* 1940 Apr. 10 Vol. 33 No. 4 pp. 260-265.

In the last 2 years some 18 cases have been met with which differed clinically and serologically from classical typhus and boutonneuse fever. Four cases are described in detail. There was no primary sore noted on any of the patients and the rash differed from that of true typhus or boutonneuse fever. Serologically all the cases showed a strong positive reaction for the Luna strain of *Proteus* OX19 and considerably less for OX10. All the people lived in rat-infested dwellings.

D. H.

OUALLE SÁNCHEZ (Héctor) Estudios sobre tifo exantemático. Suero de convalecientes concentrado. Nota preliminar. [Concentrated Serum of Convalescents in the Treatment of Typhus.]—*Rev. Chilena de Hig. y Med. Preventiva* 1939 July-Dec. Vol. 2 No. 7-12 pp. 349-381. With 4 figs. & 16 charts [12 refs.]

A serum with a Weil-Felix titre of 1/640 was concentrated by passage through a collodion sac which allowed water and salts to pass but not the globulin antibodies till a serum of a titre of 1/15 000 was obtained. With this a series of tests were carried out on 80 guinea-pigs divided into 16 groups of 5 and kept under observation for 2 weeks after the experiment was made. The virulent material for intraperitoneal inoculation was cerebral tissue with defibrinated blood diluted with physiological saline. Inoculation of the serum was made from two days before that of the virus to eight days after and the results are depicted in a series of 16 graphs.

Attention was then directed to human subjects 50 persons direct contacts of 12 cases were injected. Of these 50 two only developed typhus one of these inoculated five days before his attack presented a very mild course. The author concludes that injection of the serum of convalescents is a harmless procedure but that its activity is small if given towards the end of the period of incubation. H H S

BORDON (C. D.) & BOSTON (ROV. J.) A Preliminary Report on the Practical Epidemiology and Control of Endemic Typhus Fever in Georgia.—*Amer. J. Trop. Med.* 1940 July Vol. 20 No. 4 pp 537-549 With 4 graphs 2 charts and 1 map.

This paper is complementary to that on the engineering side of the problem which is summarized below
Statistics are dealt with in the first place from 1832 to 1899 4702 cases of typhus were reported in the State of Georgia July August and September are the peak periods of the year. The attack rate in whites is just over 7 times that in the coloured people. Practically all the cases occur in the small towns and villages and these are situated for the most part in the Southern Counties of the State this is accounted for by the fact that in this part of the State there is abundant food supply and harbourage for rats. Spot maps of cases have been prepared for these towns and villages and on the information contained in these maps the control measures have been initiated.

The programme is essentially one of —

1. Epidemiological investigation
2. Education
3. Garbage removal and cleaning up of premises
4. Rat extermination
5. Rat proofing which is the final, and of course the only permanent measure of protection.

It is stressed that epidemiological investigations are essential to the control of any disease and this statement is true of typhus. Control measures cannot be employed efficiently and economically until it is known whence the disease is spreading. D H

BOSTON (ROV. J.) Public Health Engineering Phases of Murine Typhus Control.—*Amer. J. Public Health* 1940 June Vol. 30 No. 6 pp 619-626 With 4 figs & 1 chart.

Because of the increasing incidence and the nature of the problem of murine typhus fever in the State of Georgia a Typhus Control Unit under the direction of a public health engineer was established in 1937. As a result of preliminary studies of the State wide problem the control programme adopted, and now being carried out consists of preliminary investigations and control measures employing the use of rat extermination garbage control and cleaning up and rat proofing. The conclusions are that the control of murine typhus fever is basically a public health engineering problem.

The use of toxic red squill bait in the form of "torpedoes" (i.e. bait in a roll of twisted paper) is recommended as an effective means of temporarily reducing the rat population. Garbage control and cleaning up affords an effective means of reducing the rat population on premises through starvation and reduction of harbourage. R. A.

proofing however is the only permanent means of rat control and therefore of murine typhus control. This is a long term policy but much can be done by what is termed vent stoppage i.e. closing of all openings in the exterior walls of buildings to prevent the ingress and egress of rats and also the flashing of doors with galvanized sheet iron.

D H

RAYMOND Épidémiologie et prophylaxie du typhus exanthématique Maladie No 2. Conférence de Vulgarisation faite aux Médecins de Réserve de la Région de Paris. [Epidemiology and Prophylaxis of Typhus].—*Rev Service Santé Milit* 1940 Mar Vol. 112. No 3 pp 335-347

TOPPING (Norman H) & DYER (R E) A Highly Virulent Strain of Rocky Mountain Spotted Fever Virus Isolated in the Eastern United States.—*Public Health Rep* 1940 Apr 26 Vol 55 No 17 pp 728-731 With 1 fig

So far strains of virus isolated from cases of Rocky Mountain fever occurring in the Eastern States have been less virulent for guineapigs than strains isolated in the West. Also in cases of the fever in the East the mortality is less than in the Western States. As regards guineapigs infected with Eastern strains the scrotal lesions are rare and when they do occur there is no necrosis or sloughing. The incubation period is longer and the mortality rate is from 7 to 40 per cent. as compared with 80 to 90 per cent with the western strains. However a strain of virus (W) recently isolated from a case of fever in the East gave the following reactions as compared with a known virulent strain from a Western case —

Strain of Virus	Locality	Number of Guinea-pigs	Died	Recovered	Percent. Mortality
B.R.	Montana	50	41	9	82
W	Washington	22	19	3	86
M	Washington	41	14	27	34

Strain of Virus	Guinea-pigs	Incubation Period Days	Died	Recovered	Scrotal Lesions
B.R.	12	2-6	7	5	9
W	12	3-1	6	6	10
M	12	4-2	0	12	0

B.R. = Virulent Montana strain

W = Recently isolated strain in Washington.

M = Usual type of Eastern strain from stock.

D H

HOLLAND (G P) Notes on the Ecology of *Dermacentor andersoni* in Southern Alberta.—*Proc Entom Soc B C* Victoria B C 1940 No 38 pp 8-11 [Summarized in *Rev Applied Entom* Ser B 1940 Aug Vol. 28 Pt 8 p 143]

Since cases of Rocky Mountain spotted fever have occurred in Alberta during recent years a study of *Dermacentor andersoni* Stiles

the vector of this and other diseases is of importance and data on its habits and distribution, which are given in this paper were collected in southern Alberta during April-July 1938. At the present time *D. andersoni* is known to occur from the southern border of Alberta (about 52° 15' N lat.) The general opinion seems to be that the tick is gradually spreading northwards. In the corner of a survey along the southern border of the Province only the short-grass prairie in the south-east corner was found to be heavily infested (though there were a few ticks in other localities) and it was in this area that most of the hares (*Lepus downsi* and *Lepus richardsoni*) and probably by the native antelope (*Antilocapra americana*) which is still fairly common, but domestic sheep cattle and horses are their more important hosts. Although the ticks were sometimes fairly numerous on the open rangelands the largest numbers were obtained in the vicinity of water. The old river beds that traverse this part of the country were nearly all infested to a greater or lesser degree the smaller deeper valleys of tributaries with deep, sloping sides being more favourable habitats than the wide bottomlands of the main river beds. Since ticks are sensitive to lack of humidity it is not surprising that open dry and wind-swept areas were less frequented. The ticks occurred on low bushes and various grasses. On dull warm humid days especially just prior to rain they were very active and readily collected on the drags (pieces of white flannelette one yard square) whereas on cold and windy days or those that were particularly hot and dry most of them were too lethargic to hang on to the drag or fell off it before they could be transferred to vials. In south-eastern Alberta, the tick season apparently begins late in March depending on weather conditions reaches its peak in May and early June and comes to an end in July. Owing to the unusually wet spring of 1938 only about 35 days were suitable for collecting but during this time nearly 22,000 ticks were obtained.

ROBERTS (F. H.) The Brown Dog Tick (*Rhipicephalus sanguineus*)
—Queensland Agric. J. Brisbane 1939 Vol 52 Pt. 5 pp 529-530
With 1 fig (Summarized in Rev. Applied Entom. Ser. B 1940 Aug Vol 28 Pt 8 p 146)

"Brief popular notes are given on the morphology and bionomics of *Rhipicephalus sanguineus* Latr. which breeds very rapidly in the climate of Queensland and causes loss of vitality in dogs on which it is abundant but is not associated in Australia with the transmission of disease. Occasionally it is carried into dwellings by dogs and, although it seldom attacks man, it may become sufficiently numerous to be considered an important household pest. Anaemic and phenolic dips may kill ticks on the dog but do not prevent larval nymphs and young adults in the animal's sleeping quarters from attaching themselves shortly afterwards. Treatment with derris has been found to be the only way of preventing immediate reinfestation. It may be applied as a powder shaken well into the coat and on to the skin or as a wash

that is allowed to dry on the coat. The wash is made by soaking 2 oz derris powder overnight in 1 gal water and adding just before use next morning enough soap to make a good lather. Derris should be used with caution on young puppies especially those of delicate breeds and care should be taken to keep it away from the animals eyes since it may cause them to become inflamed. Treatment should be carried out every 6-7 days until the infestation is eradicated care being taken to remove by hand any ticks in the ears on the eyelids or between the toes. All old bedding should be burned or boiled, and the bedding subsequently used should be examined and cleaned every week. All litter round the animal's sleeping quarters should be burned. Kennels and outhouses should be sprayed with creosote oil or crude oil care being taken to force the spray into cracks and crevices. Houses that are heavily infested should be fumigated.

[*Rhipicephalus sanguineus* is a vector of boutonneuse fever in France and has been suspected in India.]

FLORMAN (A L) & HARKENSCHEL (J) The Eastern Variety of Rocky Mountain Spotted Fever. The Experience in the Adult Medical Service of the Johns Hopkins Hospital, including the Report of a Fatal Case showing Thrombocytopenia.—*Bull Johns Hopkins Hosp* 1940 Feb Vol 66 No 2 pp 123-133

In the last nine years six cases of Rocky Mountain fever of which three proved fatal have been admitted to the Johns Hopkins Hospital. One of these cases is described in detail with autopsy notes and the other six cases are analysed from the point of view of history and clinical and laboratory findings. A marked reduction of the number of blood platelets was noted in the case described. D H

OLMER (D) & OLMER (J) Fièvre boutonneuse. Ses relations avec les autres Rickettsioses exanthématiques [Boutonneuse Fever Its Relationship with Other Fevers of the Typhus Group]—*Marseille Méd* 1940 Jan. 15 Vol. 77 No 1 pp 9-14 With 1 fig

A general review of the clinical and epidemiological features of the disease as studied by the authors over a period of 18 years in a district where boutonneuse fever is the only type of typhus-like fever which occurs and which therefore could not be confused with other members of the group with which it is contrasted. D H

1. OLMER (D) & PIERI (Jean) Diagnostic des fièvres exanthématiques [Diagnosis of Fevers of the Typhus Group]—*Marseille Méd* 1940 Jan 15 Vol. 77 No 1 pp 15-17
- ii ——— & ——— Sur les cas de fièvre exanthématique observés en période de guerre [Boutonneuse Fever in War Time]—*Ibid* pp 18-21

1. In view of war conditions and the possibility of outbreaks of typhus and trench fever the authors review the subject for the benefit of those who have had no experience of the diseases. Already some increase in the number of cases of boutonneuse fever has been noted and all suspicious cases should be isolated and treated.

ii. Cases of boutonneuse fever observed during the war period are described. D H

HOUWENAR (W) Onderzoekingen over Sumatraansche Rickett
sionen VI De pathologische anatomie van de milteloorts
bij den mensch Pathology of Mito-borne Typhus. — *Graec.*
Tijdschr v Neder Indis 1940 Apr 30 Vol. 80 No 18.
pp 1119-1140 With 29 figs. on 6 plates. [30 refs.] English
summary

A description is given of the pathological examination of 23 cases of Sumatran mite fever and 3 cases of scrub typhus (being a disease of the typhus group of fevers, with formation of agglutinins against *Proteus* & *Kingdom bacilli* mite fever with and scrub typhus without a primary ulcer)

Skin mononuclear infiltrations around vessels, glands and nerves sometimes with infiltration of the media, but never with endovascularitis. The primary ulcer is a coagulation necrosis resulting from the bite of the infecting arthropod.

Lymphatic glands swelling proliferation of the stroma focal necrosis catarrh of the sinuses with macrophagia of the endothelial cells

"**Spleen** enlargement in uncomplicated cases the consistency is firm but when pneumonia is present a regular acute splenitis may develop. Microscopically the usual picture of acute splenitis is found, with distinct erythrophagia in the endothelial cells. As more specific changes infiltrations in the trabeculae are found, especially around the vessels with formation of subendothelial granulomata in the venae of mononuclear cells. Perivascular infiltrations with penetration in the wall of the vessels and sometimes destruction of the intima with formation of a thrombus. The muscle cells are only very slightly damaged.

Lungs in many cases pneumonia is present. In the septa perivascular infiltration may be seen. *Stomach and intestine* no specific lesions were found. There are often petechiae in the mucosa and once an acute ulcer of the duodenum had developed without specific microscopical changes in the bottom.

Liver degeneration and regeneration with mitosis in the liver cells and the KUPFER cells. Erythrophagia. Small foci of degeneration necrosis and infiltration.

Kidney Interstitial infiltrations especially around the arciform vessels. Only slight changes of the parenchyma were found.

Testes interstitial infiltration with mononuclear cells, with penetration of the infiltration around the smaller vessels, thrombosis and sometimes destruction of the whole vessel.

These changes give a good explanation of the clinical symptoms apart from the general infection myocardial and cerebral symptoms are predominant. Death is often caused by heart failure. As the changes in the specific tissue of the different organs are only slight the disease being located interstitially no sequelae are found. Only a postinfectious myocarditis may trouble the patient for some months. The pathological changes differ from those found in classical epidemic and endemic typhus (with agglutination against *Proteus*

λ 19) as the chief change is a perivascular infiltration only secondarily attacking the intima whilst in classical typhus the primary disease is a destruction of the intima and media followed by perivascular infiltrations.

LEWTHWAITE (R.) & SAVOOR (S. R.) The Relation of Sumatran Mite Fever to the Tsutsugamushi Disease of British Malaya.—*Brit J Experim Path* 1940 June Vol 21 No 3 pp 117-125

The authors have already conclusively proved that scrub typhus and tsutsugamushi fever of Malaya are one and the same disease scrub typhus is tsutsugamushi fever without the primary ulcer. A similar disease has been described in Sumatra by Dutch workers who have given it the name of Sumatran mite fever and this could be described as scrub typhus with a primary ulcer this disease also belongs to the *Proteus* A A group of typhus-like fevers.

Recently strains of the virus of this disease sent by the Dutch authorities in infected white mice have been received in Malaya. These strains have now been compared with the local strains of tsutsugamushi fever. It was soon found that it was not possible to maintain the strains in white mice a finding which was contrary to the records from Sumatra. Guinea-pigs also could not be infected which is true also with regard to local strains rabbits however were readily infected by the intraocular route and in a period of 2 years these strains have been passaged from rabbit to rabbit for 70 generations.

The reaction in the eye of the rabbit was typical of that caused by the local virus of tsutsugamushi fever and numerous Rickettsiae were found in Descemet's membrane these resembled *R. orientalis* also the sera of these rabbits gave a positive Weil-Felix reaction with *Proteus* OXK.

A local papular reaction followed inoculation into monkeys and the sera of these animals also gave a positive reaction with *Proteus* OXK.

The results of cross immunity experiments indicated that the strains of virus of Sumatran mite fever and the 3 local strains of tsutsugamushi compared with it are identical.

The results of these experiments were not clear cut in all instances although the local strains protected against the Sumatra strain there was only partial protection in animals inoculated with the Sumatra strain. This is explained by the fact that the local strains had been passaged for many generations whereas the Sumatra strain was recently isolated it has also been shown that monkeys may lose immunity to tsutsugamushi in a period of months.

The authors conclude that Sumatran mite fever is not a disease *in generis* but is identical with tsutsugamushi fever D. H.

FEDERATED MALAY STATES ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1938 — [Typhus-like Fevers. pp 114-131 LEWTHWAITE (R.)]

In a previous communication by the same author [this *Bulletin* 1939 Vol 36 p 463] it was noted that from a strain of murine typhus virus, *Proteus* X19 type isolated from rats caught on an estate where tsutsugamushi fever was present and passaged through guinea-pigs a daughter strain was obtained which gave all the reactions in animals

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and in serological tests of *Proteus* AA type tsutsugamushi virus. Cross immunity experiments were carried out with known VA strains and complete cross immunity was demonstrated in 8 tests with the original V19 strain there was no cross immunity also rabbits which had given the ocular reaction with stock AA strains were immune to reinoculation with the new OVK strain.

In view of the importance of this finding the whole series of experiments was repeated this year. Fleas were fed on 4 guinea pigs infected with the original E strain OVK19. 3 guinea pigs were then placed in the tank with the infected fleas and they became infected. The strain was then passed by injection of infected brains among the animals of the third generation killed one was found to give the post mortem signs of tsutsugamushi virus infection namely peritoneal exudate with rosy secretion but without scrotal reaction. virulent infections were produced in guinea pigs infected from this animal. The strain was maintained by passage in guinea pigs and also was easily maintained in the eye of rabbits and the typical reaction was noted with numerous Rickettsiae in the cornea. Cross immunity experiments were again carried out in 8 tests with the parent OVK19 strain there was no cross immunity in 2 tests with the stock OVK strain immunity was complete. In two rabbits which had been inoculated with the OVK stock virus there was no reaction when the eye was inoculated with the freshly isolated OVK strain and vice versa.

This new strain is identical with the OVK19 strain isolated from year and both were derived from the same OVK19 strain isolated from wild rats. In this same report the relation of the virus of Sumatran mate fever to that of tsutsugamushi in Malaya is discussed (see LEWTHWAITE and SANDOR above).

McGATROD (Frederick) A Review of Immunization against Human Rickettsial Diseases.—*Trans Roy Soc Trop Med & Hyg* 1940 June 27 Vol 34 No 1 pp 1-32 [52 refs] Discussion
pp 33-38 FINDLAY (G M) LUSH (D) CHRISTOPHERS (Richard)
& McGATROD (F) (in reply)

A most comprehensive review of the subject compiled from 152 papers the majority of which have been summarized from time to time in this Bulletin but are now made available in one review. In the discussion which followed the reading of the paper Dr Findlay stated that he had recently had the opportunity of seeing something of this work at first hand in North Africa and in Paris. He referred to one or two points in the paper and pointed out that in North Africa the inoculations had been carried out in a native population among whom typhus had been endemic for generations and who therefore possessed a certain amount of acquired or inherited immunity. In the native inhabitants tested gave a positive Weil Felix reaction to the living vaccine of the murine type gave rise to severe reactions and the living vaccine of the murine type gave rise to severe reactions and for this reason had been discontinued in some places. Dr Findlay himself had been inoculated from the brains of mice infected with the exanthematic virus followed by formalin a laboratory infection with the murine virus followed but the attack was mild with only a few days fever whereas an unvaccinated fellow worker had

and moderately severe attack with high fever. It would appear from this that the killed vaccines do confer a certain amount of immunity.

D H

DURAND (Paul) & SPARROW (Hélène) Développement dans le poumon des virus typhiques et boutonneux instillés par voie respiratoire [Development in the Lung of the Viruses of Typhus and Boutonneuse Fever when Instilled by the Respiratory Route]—*Arch Inst Pasteur de Tunis* 1940 Mar Vol. 29 No. 1 pp 1-24 With 6 figs.

Young white mice are anaesthetized with ether and 4 drops of inoculum of the virus Tunis No. 1 are administered by the nasal route. At first death occurs in 4 to 7 days but when passaged from mouse to mouse death takes place in 48 hours. At post mortem a condition of haemorrhagic pneumonia is found and in the hepatized portions of lung enormous numbers of Rickettsiae are found. These are also present in the normal parts of lung. The brain of the mice is also infective but Rickettsiae are not numerous.

If mice are inoculated with the historic typhus virus obtained from infected lice the same condition occurs and enormous numbers of Rickettsiae are found in the lungs of the mice.

If the virus of boutonneuse fever is used and inoculated in the same way a similar type of pneumonia occurs in the mice but the Rickettsiae are not so numerous. The inoculum in this instance was obtained from infected ticks.

D H

DURAND (Paul) GIROUD (Paul) & SPARROW (Hélène) Inoculation pulmonaire du virus pourpre (fièvre des Montagnes Rocheuses) [Pulmonary Inoculation of the Virus of Rocky Mountain Fever]—*C R Acad Sci* 1940 May 27 Vol. 210 No. 22. pp 751-753

Mice, rabbits and squirrels were inoculated with the virus of Rocky Mountain fever by the nasal route into the lungs. Three strains of the virus were employed: one highly virulent, one less virulent, and one of only slight virulence.

Exactly the same conditions were produced in these animals with these viruses as were obtained when typhus viruses were instilled by the same route, namely haemorrhagic pneumonia rich in Rickettsiae. In the first instance the inoculum was obtained from infected guinea-pigs and when an emulsion of infected ticks was employed the same results followed.

D H

DURAND (Paul) & GIROUD (Paul) Essais de vaccination contre le typhus historique au moyen de Rickettsias tuées par le formol (souches pulmonaires) [Attempts at Vaccination against Historic Typhus by means of Rickettsias killed by Formalin.]—*Arch Inst Pasteur de Tunis* 1940 Mar Vol. 29 No. 1 pp 25-52 With 7 figs.

Numerous Rickettsiae obtained from the lungs of infected mice as reported in the previous paper were emulsified in formalin serum. Guinea-pigs were given repeated doses of the vaccine and there was no reaction but when tested later with large doses of living virus there was solid immunity.

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Monkeys and volunteers were inoculated with doses of the vaccine and again there was no reaction, but the sera of the inoculated men and animals gave a positive Weil-Felix reaction and also neutralized the virus. D H

DURAND (Paul) & GIRON (Paul) Essais de vaccination contre le virus ponpré (fièvre des Montagnes Rocheuses) au moyen de rickettsies tuées par le formol (souches pulmonaires) (Attempts at Vaccination against the Virus of Rocky Mountain Fever by means of Rickettsias killed by Formalin.)—C R Acad Sci 1940 May 27 Vol 210 No 22 pp 753-754

The vaccine consisted of the emulsified lung of infected mice in formalized serum and was kept in the refrigerator for 5 days before use.

In guinea-pigs given 3 doses of 0.5 cc. there was no reaction. Thirty days later they were tested 7 guinea-pigs were given as test dose 100 to 1000 times the minimal infective dose in one animal only there was slight fever in the others no reaction either local or general was produced Five control animals all gave acrotal reactions and 3 died. D H

SPARROW (H) & MAKERCHAL (P) Immunisation de l'homme par voie oculaire avec les Rickettsias du virus murin 1 de Tunis. (Immunisation of Man by the Ocular Route with the Rickettsias of the Murine Virus Tunis No. 1.—Arch Inst Pasteur de Tunis 1940 Mar Vol 29 No 1 pp 53-65 With 7 charts)

Lice were inoculated with the virus obtained from the brain of infected rats.

Fifteen lice intestines of the 6th passage were taken and emulsified in 1 cc of sterile saline 2 drops of this emulsion were placed on the conjunctiva of 7 young men (cases of dementia praecox). All reacted with a mild fever lasting 10 days but there were no other symptoms and no virus was found in the blood of the patients. Six months later the men were tested by repeated eye drops of the same emulsion and no reaction whatever was seen. Seven months later the men proved immune to inoculations with the virus of historic typhus and 20 months later were still immune to the virus of murine typhus. D H

LAGRET (J) 4 propos de la vaccination contre la fièvre jaune par la voie dermique Essais de vaccination contre le typhus par la même voie (Concerning Vaccination against Yellow Fever through the Skin. Attempts at Vaccination against Typhus by the Same Route.)—Bull Soc Path Exot 1940 Apr 10 Vol 33 No 4 pp 227-230

The method of vaccinating against yellow fever by means of emulsions of the brain of infected mice applied through the scarified skin has been carried out for three or four years with remarkable success see this Bulletin 1940 Vol 37 p. 82.

The author is now experimenting with a typhus vaccine prepared from the brain of infected mice and inoculated through the skin and hopes to obtain results similar to those obtained with the yellow fever vaccine. D H

DERRICK (E H) & SMITH (D J W) Studies in the Epidemiology of Q Fever 2 The Isolation of Three Strains of *Rickettsia burneti* from the Bandicoot *Isodon torosus*—*Australian Jl Experim Biol & Med Sci* 1940 June Vol 18, Pt 2, pp 89-102. With 1 fig. [Summary appears also in *Bulletin of Hygiene*]

One of 60 bandicoots (*Isodon torosus*) captured on the mainland of Australia in the Namour district was found naturally infected with the virus of Q fever as were also two of 43 captured on Moreton Island. Guinea-pigs primarily inoculated from two of these three remained afebrile for ten days but inoculation of their livers and spleens caused infection of second passage animals. With the third strain the guinea-pig inoculated primarily was infected. All three bandicoot strains gave rise to the characteristic rickettsiae when inoculated into mice and the sera of all three bandicoots agglutinated *R burneti*.

The first of the three was harbouring when arriving at the laboratory 70 nymphal scrub ticks *Ixodes holocyclus* and 11 fleas (*Pygiopsylla*) but these ectoparasites did not infect guinea-pigs. The second harboured 3 male ticks *Haemaphysalis humerosa* which also failed to infect a guinea-pig on inoculation. The same species of tick however on the third bandicoot was infected.

Briefly therefore bandicoots have been found naturally infected with the virus of Q fever which confirms the previously described agglutination of *R burneti* by the serum of captured bandicoots [*Bull of Hyg* 1939 Vol 14 p 488 1940 Vol 15 p 303] and establishes the *Isodon torosus* as a natural reservoir host of the virus H H S

SMITH (D J W) Studies in the Epidemiology of Q Fever 3. The Transmission of Q Fever by the Tick *Haemaphysalis humerosa*—*Australian Jl Experim Biol & Med Sci* 1940 June Vol 18 Pt 2, pp 103-118 With 2 figs. [Summary appears also in *Bulletin of Hygiene*]

Haemaphysalis humerosa is known to be a natural vector of the virus of Q fever among animals and the author has undertaken investigations to determine its importance in producing infection in man. He has studied the infection of the tick in larval nymphal and adult stages the transfer of virus from one stage to the next and from adult to larva the distribution of *Rickettsia* in the tick and the infectiveness of the insect's tissues and faeces.

He found that laboratory reared ticks would be infected by feeding on infected guinea-pigs in any of their stages larva nymph or adult. Next that when larvae fed on similarly infected animals about half of them were found infected in later instars. Also when nymphs were allowed to have an infective feed, 31 out of 56 were infected when they became adults. All the above were demonstrated by smears by section of tissues and by inoculation into guinea-pigs.

As regards transfer of the virus from adults to the next generation. Sixteen female ticks which had been exposed to infection were examined for transovarial passage of the virus. In eight the virus was detected after oviposition was completed (not in the others which perhaps had not actually been infected). The progeny of one of these eight was found infected. A larger series of examinations is needed to confirm this. Within the infected tick examination revealed no rickettsiae in the salivary glands, nor in the intestine anterior to the

mid-gut and rare in the hind-gut. They seemed to multiply extra-cellularly within the lumen and in the free and degenerating cells of the hypertrophic epithelium. Inferentially therefore, the faeces would probably be infective and this was found to be the case and infection might occur even through unbroken skin. The author summarizes his findings as follows:

"Larval nymphal, and adult ticks were infected with rickettsiae by feeding them upon infected guinea-pigs during the febrile period. Slightly more than half of the ticks so treated were definitely proved to have acquired infection.

Infection acquired by immature ticks was transferred through the feeding metamorphoses or metamorphoses to the adult malar.

Infected nymphal and adult ticks were found to infect about one quarter of the host guinea-pigs upon which they were fed.

Evidence suggestive of occasional transovarial passage of the virus was obtained but not confirmed.

In the tick host *R. horni* appeared to be strictly confined to the intestinal epithelial cells and the lumen of the gut.

The cell infection pattern was of the tryphus type. The cytoplasm of infected cells was often packed with rickettsiae but the nuclei were never invaded.

In partially engorged ticks multiplication of the rickettsiae appeared to take place both extracellularly and intracellularly.

The faeces of infected ticks were found to be highly infectious being capable of infecting guinea pigs when applied to either abraded or unabraded skin. This method would appear to be the natural mode of infection of the vertebrate host.

Intricated masses of infected ticks were also found to infect guinea pigs through unbroken skin. Some of the infections among abattoir workers may be attributed to such a mode of infection.

H H S

(C. Herald R.) *Rickettsia diaphana* and American Q Fever—*Amer J Trop Med* 1940 July Vol. 20 No. 4 pp. 463-469
12 refs

A paper read at the Section of Rickettsial Diseases at the 3rd Int. Congress of Microbiology New York, September 1939.

The paper comprises a general review of the subject with reference to work already published. It is now suggested that the name American Q fever should be given to the disease in man since it is believed to be identical with Q fever in Australia. The parasite of the disease is a filterable Rickettsia-like body to which the name *R. diaphana* has been given by the American workers who first isolated it from ticks and who have shown that it is filterable. It has been found that this parasite is present in enormous numbers in the spleen and skin exudate of inoculated guinea-pigs and in the viscera and excreta of infected ticks and also in egg tissue cultures. From these it was possible to prepare practically pure emulsions of *R. diaphana* and vaccines have been prepared which when inoculated into guinea-pigs have protected these animals against very large infective doses. These emulsions have also been utilized for agglutination tests and out of 72 blood samples sent in for examination from suspected cases 19 gave a positive reaction and also showed evidence of protective power. *R. diaphana* infection in nature has been demonstrated in ticks collected in Montana, Wyoming, Oregon and California. D H

HERTIG (Marshall) Cultivo de la *Bartonella bacilliformis* de un caso de verruga en el Ecuador [Cultivation of *Bartonella bacilliformis* 1.—*Bol Oficina Sanitaria Panamericana* 1940 Aug Vol 19 No 8 pp 756-758. With 1 fig English summary (9 lines)]

In the National Institute of Hygiene and Public Health of Lima four tubes containing semi-solid Noguchi's leptospira medium were inoculated with one specimen of blood from a suspected case of verruga peruana in Ecuador. On the fourth day colonies were observed which apparently corresponded to *Bartonella bacilliformis*. Subcultures showed on the fifth day typical groups suggestive of *Bartonella*. One South American monkey, probably of the *Cebus* species was inoculated in the left eyebrow and left side of the abdomen with an Ecuadorian strain and in the corresponding places on the right side with four Peruvian strains. Typical verruga peruana nodules developed on both sides.

MAYRAC (F) Note sur une affection du type fièvre des trois jours à l'occasion d'une bouffée épidémique dans la circonscription de Hienghène (Nouvelle-Calédonie) [Note on an Affection of the Type of "Three Day Fever" on the Occasion of a Sudden Outbreak in New Caledonia.]—*Bull Soc Path Exot* 1940 Apr 10 Vol. 33 No 4 pp 232-235

The principal symptoms of the disease were severe headache and pains in the back and limbs with general weakness.

The European patients described their own feelings as ça n'allait pas. Four distinct types of the disease were noted—

- 1 Simple febrile type with initial rash and usually a recrudescence of fever on the 5th day
- 2 Nervous type with intense headache
- 3 Gastro-intestinal form
- 4 A type in which the joint pains were the main feature

In one case a confluent scarlatinal rash was the main symptom.

The infection appeared to have been introduced by imported labourers as the cases spread all over the colony from these people. It is suggested that the infection was carried by culicine mosquitoes.

D H

SHORTT (H E) PANDIT (C G) ANDERSON (W M E.) & RAO (R. Sanjiva) Sandfly Fever Virus: Certain of its Properties and an Attempt at Prophylactic Vaccination.—*Indian J Med Res* 1940 Apr Vol. 27 No 4 pp 847-863

The authors have already shown that if the blood or serum from cases of sandfly fever is inoculated into monkeys a fever is produced in these animals that mice inoculated with the cultured virus become infected and that the virus can be passaged in the mice. This was done for seven generations but no increase of virulence was noted and mice inoculated from the passaged virus remained healthy and there was no evidence of pathological changes. Monkeys were also inoculated with large doses of cultured virus but without any apparent effects. It was found however that by culture of the virus on the chorio-allantoic membrane of eggs the presence of the virus in the blood of the monkeys could be demonstrated for an average of 11 days and for

19 days in one animal. Neutralizing power in the blood of these monkeys could also be demonstrated up to 69 days.

In actual cases of fever and in convalescents the presence of the virus in the blood can be demonstrated by egg culture up to three or four weeks after the onset of fever. The cultured virus was used as a vaccine from a 33rd passage in flask cultures. Eight volunteers received 2 doses of vaccine and eight others were used as controls. It was shown that virus was present in the blood of five of these inoculated persons and neutralizing bodies could also be demonstrated in the sera. Five of these men and the controls were then inoculated with the sera from cases of sandfly fever. The results were inconclusive but some evidence was obtained to show that the presence of the virus in the blood coincided with a certain degree of immunity. D H

MALARIA

PRELIMINARY ABSTRACTS IN THIS SECTION

HERNAN MENDEZ (p. 856) reports the first case of *P. ovale* infection to be found in Venezuela. The diagnosis was fully confirmed.

SICÉ *et al.* (p. 857) show that *A. gambiae* sent to Marseilles in June were able to reproduce, and point out the danger of this species being accidentally transported to Southern France during the warm season. BARBER (p. 857) shows that the invasion of new areas of Brazil by *A. gambiae* is followed quickly by epidemic malaria largely because this mosquito prefers human blood, is very easily infected and can breed near human habitations. Control should be active in the long dry season when breeding places are relatively few. *P. falciparum* is the commonest parasite found.

KRISHNAN (p. 858) shows that *A. crucians* does not establish itself permanently or play a part in the transmission of malaria in Bengal. Although larvae are plentiful adults are few in the spring, probably because the relative humidity is low. Later the conditions become unfavourable on account of the rains, and *A. philippinensis* is probably responsible for malaria transmission, which increases from time to time with unusually heavy rainfall in the drier months. It is possible to predict an epidemic if heavy rainfall occurs in these months and by the relative proportions of *P. falciparum* and *P. malariae* infections in February to May. In epidemic years the former predominates at that time. Conditions favourable to the breeding of *A. philippinensis* are noted.

STRICKLAND *et al.* (p. 859) show that *A. maculatus* though a vector in Malaya, cannot easily be infected in those parts of India in which it occurs though Indian strains sent to Malaya are as easily infected there as are the local strains. The explanation appears to be the lower general infectivity of the Indian plasmodia. TORMANOFF and CANET (p. 860) found that *A. hyrcanus* var. *siamensis* usually not infected in Cochinchina, and markedly zoophilic in its habits, may be infected if no animals are available. Control measures should therefore include the securing of animal deviation of this and other secondary vectors.

DEL PONTE (p 860) records observations on *Anopheles pseudo-punctipennis* in Jujuy (Argentine). It is by far the commonest anopheline present and is anthropophilic. Near a settlement there was an oöcyst rate of 1.7 per cent.

CROWELL (p 861) describes his method of rearing *A. quadrimaculatus* in an insectary.

WOINO-IASSENETSKY (p 861) has studied the distribution of *P. falciparum* in the human body. There is no uniformity in the distribution in the different organs. In fatal cases the accumulation of parasites is greatest in the vessels of the brain and symptoms of coma only develop when the infected cells acquire the capability of accumulating in these vessels. Coma does not occur at the height of the paroxysms but when the maturing ring forms disappear from the peripheral blood. Quinine has little influence on maturing schizonts.

In a study of multiple inoculations with *P. ovale* SYTOV (p 862) shows that successive inoculations produce a higher degree of resistance to subsequent reinoculation than does a single infection. The antitoxic element of immunity develops more rapidly than the anti-parasitic element though the latter is more durable.

SICAULT and MESSERLIN (p 862) consider the malaria of endemic countries to be a parasitic reticulo-endotheliosis. Three stages are recognized: a parasitaemic stage, a stage resembling splenic anaemia, and a final stage of malarial cachexia in which there is complete functional breakdown of the reticulo-endothelial tissues. The evolution is not regularly progressive and cure may be obtained in the first two stages. They (p 862) describe the forms of reticulo-endotheliosis which they ascribe to malaria. Three forms are seen: one resembling splenic anaemia, one with Banti's syndrome and one of a pseudo-curthotic type. In all there is enlargement of the spleen and liver with anaemia, usually of the hyperchromic variety. Further details are given.

FAIRLEY (p 863) reports a case of a hitherto unrecorded haemolytic hypochromic anaemia associated with post malarial splenomegaly of the Banti type. He suggests that the basis of the condition was escape of an intracellular lytic enzyme from a reticulo-endothelial system rendered pathological by chronic malaria. Crude liver extract and iron were successful in treatment.

GIORDANO (p 863) reports a case of occlusion of the right branch of the anterior coronary artery which he believes to have been due to malaria.

BOYD (p 863) shows that infection with a large dose of sporozoites of *P. vivax* compared with infection which follows a low dose leads to a higher proportion of successful inoculations, a shorter incubation period, a longer and more severe clinical attack and greater liability to renewed activity after termination of the attack. In *P. vivax* malaria induced by blood inoculation BOYD (p 864) found that renewed activity after the cessation of the primary attack has only been observed within a period of 8 weeks of such cessation. These infections thus differ markedly from naturally induced infections. The incubation period tends to be shorter and the finding of parasites before the onset of symptoms more common in these artificially induced infections.

HALAWANI and SOBRY (p 864) recommend the examination of thick drop preparations from haemolyzed and centrifuged blood in malaria survey work.

GRIMES and LAVERGNY (p 864) show that attacks of malaria are deleterious to patients with pulmonary tuberculosis in Madagascar especially to patients with pneumothorax in whom effusion is often produced. At a sanatorium in which remission with malaria is possible they advocate drug prophylaxis by means of rhodoquine taken for 5 days each month and show that although the action of the drug is inhibitive rather than prophylactic, the desired results are obtained.

VARTAN and DISCOMBE (p. 865) describe a case of quinine poisoning. GARRA (p 865) writes favourably of the treatment of malaria, both primary attacks and relapses, with antimony tartrate administered intravenously. The drug has a remarkable effect on the enlarged spleen.

CLYDE (p 866) describes the standardized control of *A. gambiae* and *A. funestus* in Natal, where special attention is paid to the weekly spraying of houses with insecticide during the transmission season with successful results. COVELL (p 866) reports on the use of insecticidal sprays in villages in India and advocates their use where other measures are not feasible.

STRANGWAYS-DIXON (p 867) has described the habits of *Gambusia affinis* and given practical hints on breeding. C II

KONAYAKI (Hidekazu) YOKOI (Kenji) KAWABE (Kunitaro) & TATSUMI (Senjo). Parasitological Investigation in Hainan-Island. I. Epidemiological Studies on Malaria and Splenomegaly among the Natives of Hainan-Island, South-China.—*Taiwan Igakkaï Zasshi* (Jl Med Assoc Formosa) 1940 Mar Vol 39 No 3 [In Japanese pp 409-418, 20 refs.] English summary pp. 418-419.]

An examination of 1 031 persons in Hainan Island resulted in the discovery of 51 malaria parasite carriers. 118 had enlarged spleens. All three species of plasmodium were found, *P. vivax* 20, *P. falciparum* 19 and *P. malariae* 12. Norman Wills

HERNAN MENDEZ *Plasmodium ovale*. Relación del primer caso observado en Venezuela. [Report of a Case of *Plasmodium ovale* Infection in Venezuela.]—*Publicaciones de la Division de Malariología* Ministerio de Sanidad y Asistencia Social Caracas 1939 Sept 15. No. 3. 9 pp. With 6 figs. [15 refs.]

In this paper are described and figured the parasites found in a blood film taken from a child four years of age in Venezuela. The description and illustrations appear to justify the diagnosis of *P. ovale*. Professor Martin Mayer has confirmed the diagnosis. This is the first case of *P. ovale* infection reported from Venezuela. One case from Western South America was reported by MÜHLENB. in 1934 [see this Bulletin 1935 Vol 32, p 109]. N IV

BATES (Marston) & HACKETT (L. W.). The Distinguishing Characteristics of the Populations of *Anopheles maculipes* as found in Southern Europe.—Reprinted from *Verhandlungen des VII Internat Kongresses f Entom* 1938. 1939 July Vol. 3. pp. 1555-1569.

Malaria

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Sicf (A) SAUTET (J) & ETHES (Y) *L'un des plus redoutables vecteurs du paludisme en Afrique l'Anopheles gambiae* Giles 1902 est il susceptible d'être transporté en France par les avions?—[Possibility of *A. gambiae* being introduced into France from Africa by Aeroplane]—*Rev Méd et Hyg Trop* 1939 July-Dec Vol 31 No 4 pp 137-139

Adult female *A. gambiae* were sent by aeroplane from the French Sudan to Marseilles. They were sent in test tubes without any elaborate precautions. A large proportion arrived alive. They laid eggs which developed normally in artificial breeding places at ordinary temperature in Marseilles in June. The emerged females fed on blood and were fertilized. These observations indicate that there may be a risk of this formidable vector of malaria being transported accidentally to Southern France during the warm season. N IV

BARBER (M A) *The Present Status of Anopheles gambiae in Brazil.*—*Amer Jl Trop Med* 1940 Mar Vol 20 No 2 pp 249-267 With 1 chart & 1 map

There is no doubt that this invasion of *gambiae* threatens the Americas with a catastrophe in comparison with which ordinary pestilence conflagration or even war are but small and temporary calamities. *Gambiae* literally enters into the very veins of a country and may remain to plague it for centuries. Even the penetration of yellow fever into the Orient might be a lesser evil because its vector is domestic and more easily controlled. This quotation from an interesting report adequately describes the practical importance of its subject matter. A three months study at the close of the wet and well into the dry season of *A. gambiae* on the frontier of its advance along the Jaguaribe River above and below Iguatã in Ceará yielded a wealth of valuable information. Malaria and malaria vectors were present in this part of Brazil before the invasion by *A. gambiae*. *Malaria* was transmitted by some species of *Nyssorhynchus* probably *A. tarsimaculatus* but parasite and spleen indexes were low. The advent of *A. gambiae* is followed sometimes after the lapse of several weeks by epidemic malaria. The preference of *A. gambiae* for human hosts its susceptibility to malaria and its ability to breed near human habitations in rivers, ram pools, ponds and certain plantations are sufficient explanation. Almost all adults were found in inhabited dwellings. The relative prevalence of the three species of malaria parasite varied in different places the proportion depends a good deal on chance gametocyte carriers. Among 231 positives in localities subject to *A. gambiae* transmission *P. falciparum* formed 56.7 per cent, *P. malariae* 1.3 and mixed *P. falciparum* and *P. vivax* 38.1 per cent. High infestations predominate and show no significant age incidence.

The prospect of preventing the spread of *A. gambiae* would be or but for the long dry season during which breeding places are noted these must be sought for and freed from larvae. Adults must then be attacked. When profuse breeding is in progress human transportation should be limited as much as possible. Paris green insecticidal sprays mosquito netting education and *Gambusia* can all help to limit the spread their use is discussed.

The present distribution of *A. gambiae* in Brazil has been fully investigated by R. C. SHANNON and his colleagues their findings are to be published shortly N 11

KRISHNAN (K. V.) Report(s) of the Professor of Malariology and Rural Hygiene—Rep. All India Inst Hyg Pub Health Calcutta 1937 pp. 23-28 and 1938 pp. 27-32 [Summarized in Rev. Applied Entom. Ser. B 1940 Aug Vol 28 Pt 8 pp. 153-154]

Investigations completed in 1937 showed that *Anopheles culicifacies* Giles does not establish itself permanently or play a part in malaria transmission in villages in Bengal, although the larvae are introduced every year in canal water. They appear during the non-malarious season in late winter and early spring, when the temperature of the water in the breeding places ranges between 80.6 and 84.2 F and the ratio of dissolved carbon dioxide to oxygen is low (CO_2 being less than 0.2 and O_2 0.6 per 100 000 parts). These conditions are favourable for them. On the other hand although the temperature (with maxima of 80-80 and minima of 70-60°F) is favourable to the adults, the relative humidity is low (24-43 per cent) and probably leads to the premature death of many of them. This suggestion is supported by the large numbers of larvae and small numbers of adults caught at this time. Later in the year and particularly during the malaria season (July-October) when humidity as well as temperature is favourable for the adults breeding conditions become unfavourable as a result of the rains. Not only does the temperature of the water rise to 80-85°F but the ratio of CO_2 to O_2 is reversed (the former is increased to 1.0 per 100 000 parts and the latter reduced to less than 0.6). These conditions are, however, favourable for the breeding of *A. philippinensis* Ludl. which is consequently responsible for malaria transmission.

The abnormally high incidence of malaria at the field centre during 1937 is believed to have been due to the unusual amount of rain that fell during the usually dry month of February and led to the early breeding of *A. philippinensis*. Adults of this species began to appear in March instead of July. Breeding increased greatly with the onset of the monsoon rains and adults were exceptionally prevalent between July and October. The sporozoite rate was remarkably high and as a consequence the malaria incidence also. The parasite index, the percentage of gametocyte carriers and the number of gametocytes per cubic millimetre all increased considerably and continued to do so over a longer period than usual. Reference to the history of malaria in the area revealed that such periodic increases occur once in 4-5 years and a study of the rainfall records indicated that the increases were associated, as in 1937, with unusual rainfall during the drier months.

During 1938 a further study of the causes of the periodic outbreaks of malaria that occur in the field malaria centre which is situated in the Burdwan District confirmed previous findings. In 1938 which was a non-epidemic year the parasite rate was 5-10 per cent during the dry season (March-June) 25-30 per cent in the malaria season (July-October) and 10-15 per cent during the cold weather (November-February). In 1937 the first of two years with unusual

rainfall in the dry months no increase in malaria was noticed in the dry season despite the fact that there was a marked increase in the Anopheline population and the conditions of temperature and humidity were favourable for transmission. This was probably attributable to the low numbers of gametocyte carriers. In the malaria season however both the number of Anophelines and the number of primary malaria cases increased. The parasite rate rose to 40-45 per cent. and thus high rate persisted into the cold weather. The rainfall was again unusual during the dry months of 1938 and a severe epidemic occurred. Malaria was prevalent throughout the year and the parasite rate rose to 70 per cent. in the malaria season. It thus appears possible to predict an epidemic on the basis of the amount of rain falling in the dry months. It was also observed that more than 50 per cent. of the cases of malaria in February-May and July-September 1936 were due to *Plasmodium malariae* whereas more than 50 per cent. in all months in the epidemic years were due to *P. falciparum*. The percentage due to *P. vivax* varied little during the three years. Thus it appears possible at least in this area to forecast an epidemic rise in the ensuing malaria season from a study of the relative incidence of *P. malariae* and *P. falciparum* in the earlier months of the year (dry season).

Larvae of *A. philippinensis* were found in only a minority of the reservoirs in the malaria centre and a chemical analysis of the water in them indicated that a high ratio of CO_2 to O_2 was favourable to breeding and a low ratio unfavourable the reverse of the findings recorded for *A. culicifacies* in the previous year. It was also observed that larvae of *A. philippinensis* did not occur in reservoirs in which *Euglena* or *Macrocyclus* was present or in rice-fields.

STRICKLAND (C.) ROY (D. N.) & SEN GUPTA (S. C.) *Anopheles maculatus* and Malaria.—*Trans Roy Soc Trop Med & Hyg* 1940 Apr 30 Vol. 33 No 6 pp 639-652 [21 refs.]

There has hitherto been some doubt as to the importance of *A. maculatus* as a vector of malaria in those parts of India where it prevails. Its ability to carry malaria in Assam the Dooars and in the Terai has been claimed on epidemiological grounds by several observers. The authors of the present communication describe their attempts at infecting *A. maculatus* in the laboratory. In Calcutta in the cold room, success was achieved. At laboratory temperature considerable difficulty was experienced not one out of 18 could be infected in the laboratory though 13 out of 32 control *A. stephensi* became infected. In the Dooars attempts were more successful during the epidemic season 15 out of 80 *A. maculatus* became infected. The infections were all with *P. falciparum*. All attempts at infecting the species with *P. vivax* failed. The success rate even in the Dooars was low if the species play an important part in the spread of malaria, the incidence of which is very high. Batches of *A. maculatus* were sent to Malaya where their infectivity was compared with that of the local strain by KINGSBURY and his colleagues. The Malayan and Indian strains were found to be equally infective. The poor infection rates of *A. maculatus* in India as compared with those obtaining in Malaya are ascribed to a lower general infectivity of Indian plasmodia.

TOUMAYOFF (C.) & CANET (J.) Quelques faits nouveaux au sujet de la transmission du paludisme dans la région des Terres-Rouges du Nord-Cochinchine. [New Facts concerning the Transmission of Malaria in the Red-Soil Region of North Cochin-China.]—*Bull Soc Path Exot* 1940 Mar 13 Vol 33 No 3, pp 188-194

In the Red-Soil region of Cochin-China *A. minimus* and *A. jeyporensis* are the chief vectors. *A. hyrcanus* var *sincensis* occurs but has not hitherto been found infected. It is markedly zoophilic. In an isolated labour camp devoid of domestic animals, *A. hyrcanus* var *sincensis* has been found infected in the rainy season when *A. minimus* and *A. jeyporensis* are but little prevalent. This observation indicates the desirability in certain rural centres of completing the specific measures taken to control *A. minimus* by securing the animal deviation of *A. sincensis* and other secondary vectors. This would be specially important if the artificial stagnation of water courses be employed to prevent *A. minimus* breeding. N 18

DEL POZZI (E.) Observaciones sobre *Anopheles pseudopunctipennis* en La Mendieta provincia de Jujuy. [Observations on *A. pseudopunctipennis* at La Mendieta in the Province of Jujuy.]—*Rev Inst Biol Buenos Aires* 1939 Vol 9 No 2 pp 149-155. With 1 fig. [Summarized in *Rev Applied Entom.* Ser B 1940 Aug Vol 28 Pt 8 pp 152-155.]

Investigations were carried out in February-March 1939 on the importance of *Anopheles pseudopunctipennis* Thw. as a vector of malaria at La Mendieta a settlement in one of the most malarious districts in the province of Jujuy Argentina, at an altitude of about 2,400 ft. Of 132 persons whose blood was examined, ten were infected with *Plasmodium vivax* six with *P. falciparum* and four with *P. malariae* while one had a mixed infection. Of 45,818 *Anophelinae* taken in 1938 in houses in the provinces of Tucuman Catamarca, Salta and Jujuy 45,569 were *A. pseudopunctipennis* and in the author's investigations at La Mendieta this species was the only *Anophelinae* taken in houses. It was the commonest species caught at nightfall near the settlement by means of human bait the others being *A. allatarius* Arnib. *A. argyritarsis* R. D. and *A. tarsimaculatus* Goeldi and was the only one taken at night in the hills. It was also taken in a trap baited with a calf. It attacked man throughout the night in the hills and the probability of contracting malaria depends chiefly on the percentage of infection in it. No infection was observed in 58 females of *A. pseudopunctipennis* taken in the hills with human bait but of 644 taken near the settlement 17 per cent. showed oöcysts on the stomach. When batches of not less than 10 females of *A. pseudopunctipennis* were allowed to feed on carriers of gametocytes of *P. vivax* and dissected 10 days later no infection was observed. The morphology of the adults of both sexes the larvae and the eggs of *A. pseudopunctipennis* is described, and a key is given to the pupae of the four *Anophelinae* taken. Other mosquitoes caught in the hills at La Mendieta included *Aedes scapularis* Rond. *Harmagogus* sp. and *Psorophora ferox* Humboldt which are potential vectors of jungle yellow fever. Larvae and adults of *C. fatigans* Wied. (*quinquefasciatus* auct.) and *Aedes aegypti* L. were taken in houses.

CROWELL (Robert L.) *Insectary Rearing of Anopheles quadrimaculatus* (A Preliminary Report.)—*Amer J Hyg* 1940 July Vol 32 No 1 Sect C. pp 12-20 With 3 figs

The author describes methods of rearing and maintaining a large laboratory stock of *Anopheles quadrimaculatus* it has been in captivity since 1932 and had gone through nearly 90 generations at the time of writing. He has simplified a technique previously described by Boyd so that one man can now do all the necessary work in two hours daily producing about 1 500 larvae a week for tests of larvicides and maintaining a population of three to five thousand adults.

The method (fully described and illustrated) is based on feeding larvae with pulverized dog biscuit and rearing adults in a cage of about one metre cube they are fed on a clipped rabbit.

P A Buxton

WOINO-IASSENETSKY (M V) La distribution des parasites dans l'organisme de l'homme au cours de la malaria tropicale. [Distribution of Parasites in the Human Body in Tropical Malaria.]—*Med Parazit & Parazit Dis* Moscow 1939 Vol. 8. No 6 [In Russian pp 3-28 With 7 figs [25 refs] French summary pp 28-29]

The author's studies are based on 139 fatal cases of acute *P. falciparum* malaria. In thirty of these clinical details were sufficient to permit of a comparative study of the distribution of the parasites in the body in relation to the symptoms displayed. The distribution of parasites is very varied. In fatal cases the greatest accumulation of parasites occurs in the vessels of the brain and in the adipose cellular tissue of the mucosa of the alimentary canal and of the pancreas. In pregnant women there is also an accumulation in the inter villous spaces of the placenta and in the capillaries of the breast. In cases in which coma has not occurred there is no accumulation of mature schizonts in the blood vessels of the brain. It would appear that in such cases the parasites mature in the vessels of the intestinal mucosa of the adipose cellular tissue and of other tissues. Symptoms of coma only develop when infected red-cells acquire under certain influences the capacity of accumulating in the cerebral capillaries. Involvement of the nervous system is not dependent on the numbers of parasites present in the body when the number is very low however coma is unlikely to occur. Cerebral cases in which but few parasites are found at autopsy are explicable by the action of quinine. There is no uniformity of distribution of parasites in the different organs. Large schizonts are found at the site of large parasite accumulations elsewhere small unpigmented forms predominate as in the peripheral blood. Coma does not occur at the beginning or at the height of a paroxysm but only after the lapse of 20 to 24 hours after the appearance of the generation of parasites that is responsible for the condition and when the maturing ring forms disappear from the peripheral blood. On maturing schizonts quinine appears to have but little influence. Gametocytes are formed exclusively in the bone-marrow and the spleen they are very rarely seen at the sites of large parasite accumulations.

N IV

- SIXTON (J. A.) Studies of Infections with *Plasmodium ovale*. V The Effects of Multiple Inoculations upon the Degree and Nature of the Immunity developed.—*Trans. Roy Soc. Trop Med. & Hyg* 1940 Apr 30. Vol 33 No. 6 pp. 585-595 [24 refs.]

This is a study of the reactions of the human host as shown by parasitic and febrile response to successive inoculations of *P. ovale*. Ninety-eight cases, in which the primary attack was not modified by early treatment are considered of these 40 subsequently received a second inoculation 12 of these a third, and one a fourth inoculation. It was shown that successive inoculations produce a progressively higher degree of resistance to subsequent reinoculation than does a single infection. In this respect *P. ovale* resembles the other species of human plasmodia. The anti-toxic element of the immunity as evidenced by diminished febrile response to infection, appears to be developed more rapidly than the anti-parasitic element and more rapidly than in the case of infection with the other three human plasmodia. In the absence of renewed infection the anti-parasitic element of the immunity, appears to be more durable than the anti-toxic element. N 17

- SICALT (G.) & MESSERLIN (A.) L'évolution de la réticulo-endothéliose palustre (1er mémoire) [Evolution of Malarial Reticulo-Endotheliosis].—*Bull Soc Path Exot* 1940 Apr 10 Vol 33 No 4 pp 272-279

In this paper malaria of endemic countries is considered as a parasitic reticulo-endotheliosis. Three stages are recognizable in its evolution. The first stage corresponds to the parasitaemic period of the disease and the reticulo-endothelial changes are in large part secondary to the blood infection. In the second stage there is loss of function of the reticulo-endothelial tissue the clinical picture is that of splenic anaemia. In the third stage there is a complete functional break-down of reticulo-endothelial tissues and of parenchyma functionally associated with them the clinical picture is that of malarial cachexia. This evolution is not regularly progressive successive exacerbations may be separated by long intervals and spontaneous or therapeutic cure may occur during the first two stages of the process. N 11

- SICALT (G.) & MESSERLIN (A.) Quelques formes souvent méconnues de la réticulo-endothéliose palustre (2e mémoire.) [Some Frequently Unrecognized Forms of Malarial Reticulo-Endotheliosis].—*Bull Soc Path Exot* 1940 Apr 10, Vol 33 No 4 pp. 280-287

The observations in this paper are based on the study of 82 patients mostly middle aged all resident in hyperendemic malarial regions of North Africa. They comprise three clinical types (1) a splenic anaemia type with splenomegaly and an intense anaemia, the red-cell count often being below 1,500,000 (2) a type exhibiting Banti's syndrome with splenomegaly, moderate anaemia and terminal ascites and (3) a pseudo-cirrhotic type with enlarged spleen and liver and occasional attacks of ascites. In all these cases the authors believe that the pathological conditions were directly or indirectly attributable to malaria. Features common to all cases were splenomegaly, well

below the umbilicus anaemia generally of the hyperchromic variety enlargement of the liver with disturbance of its functions and the frequent occurrence of ascites general weakness lowered arterial tension and occasional febrile attacks and a humoral syndrome consisting of increase of serum euglobulin precipitable by distilled water a decrease of blood cholestrin and a frequent increase in the bilirubin content of the blood

Four illustrative cases are described.

N II

FAIRLEY (N Hamilton) A Peculiar Haemolytic Hypochromic Anaemia associated with Post-Malarial Splenomegaly of Banti's Type—*Trans Roy Soc Trop Med & Hyg* 1940 Aug 16 Vol. 34 No 2, pp 173-186 With 2 graphs

A detailed account of a case of a hitherto unrecorded haemolytic hypochromic anaemia associated with post malarial splenomegaly of Banti's type. Injections of refined liver extract with iron therapy and blood transfusions failed, but crude liver extracts and iron *per os* unexpectedly produced satisfactory haemopoiesis. Splenectomy was followed by a haemolytic megalocytic erythroblastic anaemia. It is suggested that the basis of the condition was escape into the blood of an intracellular lytic enzyme from pathological reticulo-endothelium following chronic malaria.

W P Kennedy

GIORDANO (Francesco) Un caso di blocco di branca destra in malarico cronico [Coronary Occlusion in Chronic Malaria.]—*Riforma Med* 1940 Mar 30 Vol. 56 No 13 pp 403-410 With 2 figs.

The author directs attention to two previous publications in which he described the frequency of cardiac involvement in malaria infections characterized for the most part by cardiovascular dilatation with disturbance of rhythm. He describes in detail the case of an old chronic malaria patient in whom the cardiac symptoms are attributed to occlusion of the right branch of the anterior coronary artery. The report is illustrated with electro-cardiograms and radioscopic appearances. He believes malaria to have been the primary cause of the condition.

N IV

BOYD (Mark F) The Influence of Sporozoite Dosage in Vivax Malaria.—*Amer J Trop Med* 1940 Mar Vol. 20 No 2, pp 279-286

Anopheles mosquitoes employed in inoculation are dissected subsequent to their application and only those containing sporozoites in the salivary glands are recorded as having effected the inoculation. The quantitative infection of various lots of mosquitoes is determined by the number of oocysts found in the stomachs of individuals of the lots that have been dissected during the maturation of infection. In this paper a comparison is made of cases infected with lots of mosquitoes of which one at least harboured more than 100 cysts per stomach with cases infected with lots of mosquitoes of which none were observed with more than 50 cysts. The author's conclusions are as follows—

The dosage of sporozoites of *P. vivax* with which a susceptible person is inoculated as deduced from the quantitative infection of a lot of mosquitoes and the number of specimens of such a lot employed for an

inoculation, exerts a significant effect on the subsequent infection. If the dosage is small, the proportion of unsuccessful inoculations will be high. The duration of the incubation period tends to vary inversely with the dose of sporozoites received. The duration of the clinical attack appears to vary directly with the dose of sporozoites, and inversely with the length of the incubation period.

Renewed activity is most frequent following induced termination of attacks produced by heavily infected mosquitoes. There is some tendency for patients inoculated with such mosquitoes to experience a greater number of severe paroxysms than do those inoculated with lightly infected mosquitoes. N IV

BOYD (Mark F.) Some Characteristics of Artificially Induced Vivax Malaria.—*Amer J Trop Med* 1940 Mar Vol 20 No 2 pp 269-278

The observations reported are based on the records of 54 patients successfully inoculated with trophozoites of *P. vivax*. Intravenous inoculation of not more than 10 cc of the donor's whole blood, citrated was the method employed. With such small volumes of blood no danger arises from the possible incompatibility of donor and recipient. The incubation period tends to be shorter than that following natural infection. The detection of parasites before the onset of clinical symptoms is more common than in the case of natural inoculation. The mean duration of the primary attack in susceptible persons differs but little from that of naturally inoculated persons, nor do the characteristics of the paroxysms differ. Renewed activity after the cessation of the primary attack has only been observed within a period of 8 weeks from such cessation. In this respect artificially induced cases differ markedly from naturally induced infections. A II

HALAWANI (A.) & SOBAY (M. F.) On the Efficacy of the Method of Concentration of Blood Parasites in the Diagnosis of Malaria.—*Jl Egyptian Med Assoc* 1939 Sept Vol 22 No 9 pp 509-516.

To concentrate blood parasites the authors take 0.5 cc of blood in 10 cc of 1 per cent acetic acid (or formalin) solution. The solution is centrifuged for 10 minutes at 3,500 revolutions per minute. The supernatant fluid is pipetted off and a drop of the sediment examined. One hundred cases suspected of malaria, were examined. The examination of two thick drop preparations from each case showed 52 infected. Subsequent examination by the concentration method revealed parasites in 80. Only 11 crescent carriers were found by the thick drop method 31 by the concentration method. The authors recommend the method for malaria survey work. N IV

GRIMES (Ch.) & LAVERGNE (J.) Action prophylactique antipalustre des médicaments gamétocides employés seuls en particulier chez les bacillaires avancés. [Antimalarial Prophylactic Action of Gametocidal Drugs, with Special Reference to Advanced Cases of Pulmonary Tuberculosis.]—*Bull Soc Path Exot* 1940 Mar 13 Vol 33 No 3 pp 194-201

This paper is based for the most part on experience in a tuberculosis sanatorium in Madagascar in which nearly all patients have suffered from malaria, and in which reinfection with malaria is possible. An

attack of malaria is a serious complication of tuberculosis and may undo much of the good conferred by sanatorium treatment. In pneumothorax cases the complication is specially grave after a febrile malaria attack a large pulmonary effusion is very likely to occur. The clinical prophylaxis of malaria thus assumes considerable importance in a tuberculosis sanatorium.

The authors have used rhodoquine, praquine and rhodopraquine drugs which have gametocidal and antisporegonic properties. Of these rhodoquine is the best tolerated by enfeebled patients and is the most effective. They recommend the administration of a five-day course of rhodoquine 0.03 gm. a day every month. During 1938 a year in which these drugs were systematically given none of the 39 pneumothorax cases had a large pleural effusion a complication which was of frequent occurrence in previous years. The authors realize that the dysgonic action of these drugs is inhibitive rather than prophylactic but they are effective in securing the desired result. Quinacrine is ill tolerated by this class of patient and prophylactic quinine is of small value. N IV

VARTAN (C. K.) & DISCOMBE (G.) Death from Quinine Poisoning — *Brit Med J* 1940 Mar 30 pp 525-526 With 2 figs on 1 special plate

A woman aged 34 who had always lived in or near London and who had never had malaria took 16 quinine pills as an abortifacient. The amount of quinine sulphate ingested approximated 6.08 gm. She developed symptoms very closely resembling those of severe blackwater fever and died after nine days illness. The difficulties of diagnosis and the necropsy findings are fully described. N IV

GARRA (Giuseppe) Cura della malaria con il tartaro stibiato secondo il metodo de Nunno (Studio clinico sui nazionali e sugli indigeni.) [Treatment of Malaria with Antimony Tartrate according to de Nunno's Method.]—*Riforma Med* 1940 Mar 30 Vol 56 No 13 pp 410 413-18 With 2 figs.

A record of the results of treatment of 29 cases of malaria by intra venous injections of antimony tartrate according to the method devised by DE NUNNO [see this *Bulletin* 1939 Vol. 36 p 500]. The observations were made in Italian East Africa twelve patients were Italian, seventeen natives. There were 8 *P. vivax* and 13 *P. falciparum* infections in 8 cases no parasites were found. The author thinks highly of the method of treatment which was well tolerated. It has a remarkable influence on the enlarged spleen. The action of the drug appears to be more prompt on primary infections than on relapses, but the majority of cases treated were those in which the more usual antimalaria remedies had failed to effect a cure. The effect of the treatment on the patients' general condition was most beneficial.

N IV

BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE 1940 May-June, Vol. 32, No 5-6 pp 572-582.—Le paludisme dans la marine marchande. [Malaria in the Merchant Marine.]

This is a French translation of a pamphlet prepared for the guidance of captains of British ships not carrying medical officers. It is a

supplement to the Ship's Captain's Medical Guide. Measures that should be taken to protect the ship's company from mosquito bites in infected ports, quinine prophylaxis, the symptoms of malaria, and the treatment of an acute attack are simply and clearly described.

Λ II

- HOWARD (S. C.) The Practical Application of Anti-Malarial Measures on Malayan Estates.—*Bull. Inst. Med. Res. Federated Malay States* 1939 No. — pp 1-12 With figs 1-6 on 3 plates.
 HUGHES (W. E.) The Control of Urban Malaria (Kuala Lumpur).—*Ibid.* pp 13-17 With figs 7-9 (2 on 1 plate & 1 folding)
 WILSON (T.) The Control of Rural Malaria in Malaya.—*Ibid.* pp 18-22 With figs 10-11 on 1 plate.

These are three lectures given in an international course of malariology arranged by the League of Nations Health Organisation in Singapore. Those conversant with reports published in recent years concerning much admirable work on malaria control and prevention carried out in Malaya will find nothing new but the lectures are useful and interesting summaries of successful work in this field. Λ 17

- CLUTTER (F. W. P.) Malaria Control in Natal and Zululand.—*South African Med. J.* 1940 Mar 23 Vol 14 No. 6 pp 113-117
 Also in *Public Health* Johannesburg 1940 Aug. Vol. 4. No 11 pp 18-19 23 25

Malaria has always been very prevalent in the north coastal portion of Natal but prior to the epidemic of 1932 malaria control was not taken very seriously. The two vectors of malaria are *A. gambiae* and *A. funestus* both almost exclusively anthropophilic and house-frequenting; their breeding habits are however very dissimilar. Since 1933 control methods have been standardized. Great prominence is given to the destruction of adult mosquitoes in dwellings by means of an insecticidal spray. Houses are sprayed weekly throughout the transmission season with a mixture of pyrethrum and commercial paraffin sometimes more frequently. Very great success has attended the application of these measures. Morbidity and mortality statistics are not available to show the diminution of the incidence of malaria, but diminished hospital admissions, fewer positive blood films submitted for examination and above all, a marked improvement in labour and economic conditions are sufficient testimony to the success achieved. Λ II

- COVILL (G.) Désinsectisation des habitations au moyen de pulvérisation de liquide insecticide à base de pyréthre comme mesure de prophylaxie antipaludique. Malaria Control with Insecticidal Sprays.—*Bull. Office Internat. d'Hyg. Publique* 1940 May-June Vol 32 No 5-6 pp 564-569

This report describes an attempt at controlling malaria in two villages close to Delhi, Nizamuddin and Jangpura, with an insecticidal spray. A 1 in 20 dilution of Pyrethide 20 in kerosene oil. The first year's observations have already been published (see this *Bulletin*, 1938 Vol 35 p 901). Although it is not possible to determine with accuracy the value of the operations in these villages the author

considers that with adequate organization and supervision the method merits further trial especially in small isolated communities where other measures are not economically feasible. The cost of spraying compares favourably with that of temporary antilarval measures.

N IV

STRANGWAYS-DIXON (D) *Gambusia affinis holbrooki*. Imported Antimalarial Fish in East Africa.—*East African Med J* 1940 Mar Vol. 16 No 12. pp 450-455

A description is given of *Gambusia affinis holbrooki* and of its life history and habits. There were difficulties experienced in acclimatizing these fish at an altitude of 6 500 feet in Kenya but the difficulties have been surmounted and there are now distribution centres in most provinces in Kenya. The paper contains practical hints for the breeding and the distribution of the fish.

N IV

BACILLARY DYSENTERY AND INTESTINAL PROTOZOAL INFECTIONS

PRÉCIS OF ABSTRACTS IN THIS SECTION

Bacillary Dysentery—BURKITT (p 867) uses Pulv. rhel in the treatment of bacillary dysentery giving one teaspoonful with water every hour until the rhubarb appears in the stool and then less frequently. He reports that with this treatment none of his patients died in a period of 21 years during which he employed it in Nairobi. GORLITZER (p 868) reports success in the treatment of Shiga Kruse infections by means of prontosil. Improvement is obtained even in cases of long standing. DRUMMOND (p 868) has obtained success in treatment with soluseptasine and advises further trials of this drug.

Protozoal infections—SPADARO (p 869) reports that human giardiasis is common in Eritrea and thinks that in some way it is related to infection in rats.

GRÜNEIS and PILGERSTORFER (p 869) have studied the anaemia associated with infections with *G. intestinalis* and conclude that it is not directly the result of infection but that it is caused by long standing inflammation of the intestine, particularly of the duodenum. Eradication of the flagellates without iron therapy did not cure the anaemia but the administration of iron even in the continued presence of the flagellates resulted in improvement. It seems therefore that though the flagellates are not responsible for the inflammation the latter is favourable to them.

LAVIER (p 869) has described the method of binary fission of *Giardia muris*.

GALIZZI (p 870) reports cure by means of atebirin or other acridine derivatives of 5 cases of infection, but definite cure can only be accepted after long observation.

Experimenting on himself with *Chilomastix manili* WESTPHAL (p 870) concludes that the intensity of infection is directly proportionate to the degree of failure of carbohydrate digestion in the intestine and that the presence of the flagellate is the result rather than the cause of any intestinal derangement with which it is

associated. DE MURO and CERATOLO (p 871) however state that *Chelonastix mesnili* produces a catarrhal colitis of a putrefactive type.

C W

BURKITT R W Treatment of Acute Bacillary Dysentery [Correspondence.—*Brit Med J* 1940 May 18 p. 831 [Summary appears also in *Bulletin of Hygiene*]

As the outcome of a discussion on bacillary dysentery held at the Royal Society of Tropical Medicine & Hygiene in March, Dr Burkitt has communicated a letter to the *British Medical Journal* in which he advocates the use of Pulvis rhei in cases of infection by bacillary dysentery regardless of the infecting bacterium. He gives a teaspoonful (not a measured drachm) with a draught of water every hour till rhubarb appears in the stool, then less frequently for a few days. He suggests that it acts by its cholagogue effect and, possibly, as a stimulant of intestinal secretions. The acute symptoms become modified as soon as the drug makes the stool red—the abdominal tenderness and rigidity are less, pain disappears, the temperature, pulse and faeces improve. The author does not say how many cases were under his care but states: "In Nairobi from 1911 to 1917 I never saved a case in any race. From 1917 when I began to use rhubarb to a couple of years ago [i.e. 1938 or a period of 21 years when I left East Africa, I never lost a case in either adult or child. Also in a hospital of 1,500 beds dysentery deaths fell from 30 daily to three when this form of treatment was adopted."

H H S

GÖRLITZER (V) Ueber Behandlung von Bakillen-Dysenterie mit Prontoal. [Treatment of Bacillary Dysentery by Prontoal.]—*Schweiz Med Woch.* 1940, Mar 30 Vol. 70 No. 13 p. 281

The author employed prontoal in the following manner for treating cases of bacillary dysentery: one tablet [dose not stated? 0.5 gm.] three daily for three days; on the evening of the third day 10 drops of Tinct. opii; fourth to seventh days one tablet of prontoal twice daily and thence daily a charcoal tablet. Whether prontoal rubrum or album was used seemed to make no difference: the results were equally good.

All the patients cited had Shiga Kruse bacteria in the stools. Early cases reacted "in a few days": fever dropped, stools became normal, and discomfort ended. Even those who had been ill for a year and had received various forms of treatment, including vaccines within a fortnight were free of fever and pain. One patient with long-standing disease and a fistula between the bowel and the bladder, fever, emaciation, abdominal pain, and blood-stained stools, lost the fever in a week and the pain disappeared, the stools became formed and appetite improved and in a fortnight the improvement and gain in strength were such that the patient was able to get up. The author prescribes a soft bland diet for six weeks, after which time examination failed to reveal dysentery bacteria.

H H S

DRUMMOND (J) Sulphonamides in Treatment of Bacillary Dysentery [Correspondence.]—*Brit Med J* 1940 Sept. 14 pp. 367-368.

The author has treated 7 cases of bacillary dysentery (3 Flexner 2 Morgan, 1 *eutistici* and 1 *pseudo carolinensis*) with 5 cc. sulaseptazine

parenterally each day combined with 6 tablets orally for 5 days. The symptoms were typical but in all the condition of the bowel became normal within 10 days. The series is small but the results have been so impressive that the author advocates further trials of the method. C IV

SPADARO (Orazio) Osservazioni sulla lambliasi in clima tropicale [Lambliia Infections in the Tropics.]—*Rass Sanitaria dell' A O I* Addis Ababa. 1939 Sept 9 Vol. 1 No 3 pp 60-64 With 1 chart. [38 refs.]

The author points out that lamblia infections are common in Massaua, Eritrea particularly during the winter months. He seems to think that the human infections are in some way related to those of rats though it has been established that *Giardia muris* is distinct from the human parasite C M Wenyon

GRÜNGLIS (Paul) & PILGERSTORFER (Erich) Ueber das Zustandekommen anämischer Zustände bei der Lamblieninfektion des Menschen [Causation of Anaemic Conditions in Human Lambliia Infections.]—*Wien Klin. Woch* 1939 Nov 3 Vol 52. No 44 pp 991-993 [39 refs.]

The authors refer to the statement so often made that lamblia infections are liable to be followed by anaemia. From this point of view a number of cases harbouring the flagellate were carefully investigated a study of the blood and bone marrow changes being made. It is concluded that the flagellate alone is unable to bring about an anaemia but that it is the occurrence of long standing inflammatory conditions of the intestine particularly of the duodenum, which is directly responsible. The type of anaemia corresponds with this view as also does the improvement following the administration of iron even in the continued presence of the flagellates. In one case there was added a cirrhotic condition of the liver which was reflected in the type of anaemia present. The eradication of the lamblia infection by atabrin or a new acridine derivative which was tried was not followed by disappearance of the anaemia in the absence of iron therapy. It seems therefore, that the flagellate itself is not responsible for the inflammatory condition of the intestine which, however is favourable to its maintenance as well as to the development of the anaemia. If the condition of the intestine is improved by modern methods of treatment the response to iron therapy is more marked. C M W

LAVIER (G) Le mode de division des formes végétatives dans le genre *Giardia* [The Method of Division of *Giardia*.]—*C R Soc Biol* 1939 Vol. 132. No 25 pp 452-455 With 7 figs.

In this paper the author describes with the aid of illustrations the complicated process of binary fission of *Giardia muris*. This is the first time that all stages of this division have been depicted though certain of them had previously been given for the human parasite by WENYON and O CONNOR. C M W

GALIZZI (João) Novo tratamento da giardíase humana. [New Treatment of Human Lamblia.]—*Brasil Medico* 1939 Mar 4 Vol 53 No 10 pp. 329-334 [12 refs.] English summary

The paper reviews the clinical symptoms associated with giardia infections and gives an account of five cases which were freed of the flagellates by atebrio or other acridine derivatives. The author reports only the parasitological cure for as he says other digestive complaints were treated at the same time. He considers that a definite cure can be accepted only after a long and continuous observation

C M W

VEGHELYI (Peter V) Giardiasis.—*Amer J Dis Children* 1940 Apr Vol 59 No 4 pp 793-804. With 1 chart. [17 refs.]

This paper appears to be an amplification of the one already reviewed in this Bulletin 1940, Vol 37 p 378

C M W

WESTPHAL (Albert) Beziehungen zwischen Infektionsstärke und Krankheitsbild bei Infektionen mit *Chilomastix muris* und anderen Dickdarmflagellaten [The Relationship between Intensity of Infection and the Clinical Symptoms in Infections with *Chilomastix muris* and Other Intestinal Flagellates.]—*Ztschr f Hyg u Infektionskr* 1939 Oct 21 Vol 122 No 2 pp. 146-158 With 2 figs [14 refs.]

By a series of ingenious experiments carried out upon himself the author has attempted to obtain evidence of the pathogenicity of the intestinal flagellate *Chilomastix muris*. In the first place he infected himself by the ingestion of excysted forms of the flagellate which he harboured for a considerable time without any symptoms. The ingestion of pure reduced iron powder gave rise to diarrhoea associated with a great increase in the number of flagellates. The acquired infection disappeared, whereupon the author again ingested cysts from another case. On this occasion again infection took place but was associated with a diarrhoeic condition. It might have been thought that this was proof of the pathogenicity of the flagellate but from the stool was isolated a strain of *Bact coli* which proved to be pathogenic to cats. After the subsidence of the diarrhoea the flagellate infection persisted. It was noted that the degree of infection varied from time to time but was most intense when the stool was soft. This was true also of an accompanying *Enteromonas hominis* infection. As there were no further intestinal symptoms it appeared that the fluctuations in the infection were due to changes in the intestinal contents. In another experiment the diet was arranged so that a high proportion of ingested carbohydrate arrived undigested in the large intestine. This again was associated with a marked increase in the intensity of the infection. It would seem that the intensity of the infection is directly proportional to the degree of failure of carbohydrate digestion in the intestine and that the presence of the flagellate is the result rather than the cause of any intestinal derangement with which it is associated.

C M W

DE MURO (P) & CURATOLO (A) Colite catarrale da *Chilomastix mesnili* [Catarrhal Colitis due to *C. mesnili*].—*Policlinico Sez. Prat.* 1940 Feb 12. Vol 47 No 6 pp 213-16 219-20 [38 refs]

The literature of *Chilomastix mesnili* infection is reviewed and the symptoms of nine patients harbouring this parasite are discussed. It is concluded that the flagellate is the cause of a catarrhal colitis of a putrefactive type. C M H

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES XXXVI *

Eyelids—Mycetoma of the lid is reported by ALDRIDGE and KIRK¹ in a Nubian girl from the district of Halfa. The granuloma formed a painless tumour the size of a marble in the upper lid the skin was not involved. The histopathological appearance was typical of mycetoma.

Conjunctiva—Cases of streptothrix infection of the conjunctiva have been described by BADIR² FADEL³ and EL BAKLY⁴. The disease is characterized by the formation of yellowish vascularized firm nodules in the bulbar conjunctiva which involve the episcleral tissue. Cure is effected by the excision of some or of all the nodules. Infection seems to occur from grain dust when the harvest is being gathered.

Trachoma—TABORSKY⁵ speaking from experience of the disease in Russia Germany Austria and Palestine found the clinical picture in all countries identical. Follicular development and papillary hypertrophy are very marked in the trachoma of North Russia this may be due to an excessive lymphatism of the inhabitants caused by residence in comparatively sunless cities. In the Ukraine the people of rural districts suffered more severely than urban populations. SHIGA⁶ has given some account of the disease in Japan. The index among elementary school-children has fallen from 17 per cent in 1913 to 12 per cent in 1933 girls being slightly more affected than boys. Amongst army recruits the incidence decreased from 23 per cent in 1909 to 9.67 in 1933. Here as elsewhere the disease is most prevalent amongst the poverty-stricken. In districts where trachoma prevails follicular conjunctivitis is rare but trachoma is rare in some districts where folliculosis is common. A Trachoma Prevention Law exists

* For the 35th of this series see Vol. 37 pp 447-450

¹ ALDRIDGE (J S) & KIRK (R) Mycetoma of the Eyelid.—*Brit Jl Ophthalm* 1940 May Vol. 24 No 5 pp 211-213 With 1 fig

² BADIR (G) Streptothrix Infection of the Conjunctiva.—*Bull Ophthalm. Soc Egypt* 1939 Vol 32 pp 99-103

³ FADEL (A. E. L.) A Case of Streptothrix of the Conjunctiva.—*Bull Ophthalm. Soc Egypt* 1939 Vol 32 pp 104-105

⁴ EL BAKLY (M A) Streptothrix of the Conjunctiva.—*Bull. Ophthalm. Soc Egypt* 1939 Vol 32 pp 106-113

⁵ TABORSKY (J) Trachoma in Northern, Southern Russia and in Palestine.—*Rev Internat du Trachome* 1939 Oct Vol. 18. No 4 pp. 201-208.

⁶ SHIGA (H) Trachoma in Japan with Special Reference to Public Health.—*Amer Jl Ophthalm* 1940 Mar Vol. 23. No 3 pp 308-314 [10 refs]

in the country this provides for the care of patients and for the prevention of the spread of contagion.

Experiments conducted by JULIANELLE and SMITH⁷ failed to furnish any evidence of the rickettsial origin of trachoma or to confirm the observations of some other workers regarding the occurrence of a positive Weil-Felix reaction in the disease. JULIANELLE⁸ has also investigated the occurrence of inclusion bodies and has found them in thirty three per cent of 602 cases of trachoma of all types. Fifty per cent of those in whom the duration of the disease was six months were positive but at ten years the rate fell to zero. Tissues containing inclusions were twice as infective as those without. The infectivity experiments were carried out on monkeys. REIS⁹ who has reported on trachoma in Poland, also concluded that the Weil-Felix reaction can give no help in the diagnosis of the disease since her experience shows that an equally high percentage of positive reactions may be found in non-trachomatous persons suffering from gonorrhoea and in perfectly healthy people.

Many reports have been made on the treatment of trachoma by the use of sulphonamide compounds—some of these are enthusiastic and others less so. The view expressed by MACCALLAN¹⁰ seems suitably to sum up the situation. He believes that the good results reported in the treatment of the disease by drugs of the group are due to the elimination of superimposed bacterial infections. SPRING¹¹ found that fifteen adults so treated having other associated acute eye infections, recovered rapidly as far as these secondary infections were concerned, but the trachoma was practically unaffected. FORSTER¹² has reported favourably. He treated 167 American Indian school-children with sulphamylamide and found the disease to be arrested in 125 after a course of three weeks. In the remaining 42 a further course of the drug was required. Approximately fifty per cent of the children in this school were trachomatous. TAYLOR¹³ treated 31 cases—16 were cured, 11 ameliorated and 4 unchanged. Contrary to the usual experience the treatment did not appear to affect any associated mixed infections. Corneal lesions responded more rapidly than conjunctival ones, and papillary hypertrophy was more quickly

JULIANELLE (L. A.) & SMITH (J. E.) Studies on the Infectivity of Trachoma. IX. Immunological Aspects of the Rickettsial Concept.—*Amer Jl Ophthalm* 1940 Jan Vol 23 No 1 pp 62-67 [14 refs]

⁷ JULIANELLE (L. A.) Studies on the Infectivity of Trachoma. V. Frequency and Distribution of the Inclusion Body and its Possible Relation to Pathogenesis.—*Amer Jl Ophthalm*, 1940 June Vol 23 No 6 pp 633-644 With 3 figs

REIS (Harolma) La réaction sérologique d Weil-Felix et le trachome.—*Rev Internat du Trachome* 1939 Oct Vol 16 No 4 pp 181-182 [7 refs]

¹⁰ MACCALLAN (A. F.) Sulphonamide Treatment of Bacterial and Trachomatous Conjunctivitis.—*Rev Internat d Trachome* 1939 Oct Vol 16 No 4 pp 197-201

¹¹ SPRING (W. D.) Some Observations on the Use of Sulfamylamide in Trachoma and Associated Ocular Conditions.—*Amer Jl Ophthalm* 1940 Mar Vol 23 No 3 pp 271-274

¹² FORSTER (Wesley G.) Treatment of Trachoma with Sulfamylamide.—*Amer Jl Ophthalm* 1940 May Vol 23 No 5 pp 532-534

¹³ TAYLOR (Phillips) The Treatment of Trachoma with Sulfamylamide. A Report of 31 Cases.—*Amer Jl Ophthalm* 1940 June Vol 23 No 6 pp 678-685 With 2 figs [19 refs]

reduced than follicular WILSON¹⁴ reports encouraging results with respect to corneal lesions but the palpebral lesions were less responsive BURNET CUENOD & NATAY¹⁵ have made further reports on their success with sulphonamide 33 [see this *Bulletin* 1940 Vol. 37 p 448] This drug is a salt of K and Na with parasulphamide pbenyl azo-cyclohexylic acid. It appears to be relatively non toxic and to give such rapid relief to corneal lesions with their associated painful symptoms that patients readily come for treatment From 3 to 4 gm daily in regularly spaced doses of 0.5 gm is administered by the mouth It is claimed that a clinical cure is always obtained within a comparatively short time and that the patient is enabled to resume his ordinary occupation

Three cases of unilateral trachoma are reported by AYBERK¹⁶ He suggests that some difference in its conjunctival epithelium may account for the apparent immunity of the healthy eye It is noteworthy that all the affected eyes reported on had suffered from previous troubles—lachrymal in two cases and uveal in the third. [The reviewer's experience of unilateral trachoma has led him always to suspect the diagnosis. Dramatic cures may often be effected by suitable nasal oro-pharyngeal or constitutional treatment with the relief of any existing refraction error]

Cataract—PHILPS¹⁷ has investigated the source of the bleeding into the anterior chamber sometimes met with after cataract extraction Haemorrhage occurred in 13.13 per cent. of 374 extractions in certain London hospitals. The wound was the source in 85 per cent. of these and in the remainder the bleeding came from the iris or from the conjunctival flap Local trauma such as a squeeze of the lids leads to a rupture of the young vessels in the wound. Cases in which a corneo-scleral suture was used escaped the complication. Erythrocytes are unaffected by the aqueous humour but are absorbed by the iris.

Quinine Poisoning—NASHED¹⁸ observed a case of quinine amblyopia in a woman aged 60 five days after she had swallowed a tablespoonful of quinine bichloride in mistake for Epsom salts Nothing strikingly abnormal was visible on ophthalmoscopic examination but there was a slight haziness of the optic discs with narrowing of the retinal arteries and dilatation of the veins The pupils were fixed and three-quarters dilated. Vision was reduced to recognition of hand movements. Pallor of the retinal reflex and the discs and a thread-like appearance of the arteries were noted four days later After the expiration of five months vision could be corrected to 6/9 but the visual fields showed marked concentric contraction Nashid favours the view that the visual failure is due to the toxic influence of the drug on the retinal nerve elements rather than on the local vascular system. In a discussion of this paper IBRAHIM describes a similar case in a man aged 30

¹⁴ WILSON (Rowland P.) A Preliminary Report on the Treatment of Trachoma with Sulphonamide Compounds.—*Bull Ophthalm Soc Egypt* 1939 Vol. 32. pp 79-88

¹⁵ BURNET (EL) CUENOD (A) NATAY (R) & ROUSSEL (H.) Traitement chronique du trachome par l'arsouque sulfamidé 33.—*Arch. Inst Pasteur de Tunis* 1940 Mar Vol. 29 No 1 pp 68-101 [22 refs.]

¹⁶ AYBERK (Nuri F.) A propos de trois cas de trachome unilatéral.—*Rev Internat du Trachome* 1939 Oct. Vol. 16 No. 4 pp 192-197

¹⁷ PHILPS (A Seymour) Post-Cataract Hyphaema.—*Brit Jl Ophthalm* 1940 Mar Vol. 24 No 3 pp 122-135 With 7 figs

¹⁸ NASHED (Elia) Quinine Amblyopia.—*Bull Ophthalm Soc Egypt* 1939 Vol. 32. pp 209-221 With 2 figs. [19 refs.]

seen two hours after taking quinine sulphate. Retinal oedema, hazy discs and contracted arteries were noted. Vision improved to 6/18 within a fortnight.

An interesting description of the development of ophthalmology in Bombay has been furnished by DUGGAN & CURRIS¹². The General Hospital was first established in Bombay in 1878 some twelve years later than that in Madras, but separate provision for treatment of diseases of the eye was not made until 1823. The Grant Medical College was completed in 1845 and, eighteen years later owing to the generosity of COWASJI JEHLANGIR, the ophthalmic institution bearing his name was erected in connexion with it. Accommodation for in-patients has grown from 40 beds to 100. The Hospital and School have now acquired an international reputation through the care and skill of the past and present Superintendents and Staff. Sir Jamssetjee Duggan has been in charge for the past eighteen years.

H Kirkpatrick.

BELLROCI (Paolo). La reazione di Weil Felix nel Libano tracomatosi. [The Weil-Felix Reaction in Trachoma in Libya.]—*Ann di Med Nat e Colon* 1940 Jan-Feb Vol 46 No 1-2 pp 26-33.

The author summarizes his paper as follows —

The author makes reference to the results of his researches on the power of the serum of patients with trachoma in Libya to agglutinate *Proteus X19*. In 67 patients, 25 of whom had cicatrizing lesions, 29 sub-acute and 13 florid lesions, agglutination to *Proteus OX19* was observed in only 3 instances, to a titre of not more than 1:50 and to *Proteus OXA* in one instance, to a titre of 1:100.

He considers that with the strains of *Proteus* so far employed the Weil-Felix reaction has no practical or theoretical value in elucidating the aetiology of trachoma, since in this disease it is not intensely and constantly positive as it is in typhus.

C IV

¹² DUGGAN (J. N.) & CURRIS (V. K.). The Development of Ophthalmology in Bombay.—*Br J Ophthalmol* 1940 May Vol 24 No 5 pp 213-229.

MISCELLANEOUS

FIELD (J. W.). A Simple and Rapid Method of staining Malarial Parasites in Thick Blood Smears.—*Trans Roy Soc Trop Med & Hyg* 1940 Aug 18 Vol 34 No 2, pp 198-202. With 1 plate.

The observations of PANPAXA [this Bulletin 1939 Vol 36 p 410] and of SAXENA [ibid 1938 Vol 35 p 814] show that freedom from distortion of protozoa and leucocytes in thick blood smears may best be obtained by the use of basic stains in isotonic solution. The author has based his experiments on this assumption. Essential conditions appear to be: Limitation of staining to about one second, buffering of the stain to pH 6.6 to 7.0 at which contrast is maximal and the retention of some of the haemoglobin to provide a pale yellow back ground.

Of the strains tested, brilliant cresyl blue is the most generally satisfactory and the composition recommended is as follows —

Brilliant cresyl blue	1.0 gm.
Disodium hydrogen phosphate (anhydrous)	1.0 gm
Potassium dihydrogen phosphate (anhydrous)	1.25 gm.
Distilled water	100 cc.

The phosphate salts are first dissolved giving a solution approximately isotonic with serum and of pH 8.6. The stain is added and after filtration is ready for use. An alternative stain consists of —

Methylene blue	0.4 gm
Eosin	0.4 gm
Isotonic phosphate solution	100 cc.

The methylene blue is dissolved in 80 cc of the phosphate solution, the eosin in the remaining 20 cc and the eosin solution is then added to the methylene blue and the whole is filtered. With these stains any formation of scum is an indication for further filtration.

The blood smears should be not more than 50 μ thick at which the fingers of a watch can be seen dimly through the dried film. The smear is dried rapidly by waving in the air and is lightly fixed by passing through a flame for one second but the slide should not be heated to such an extent that it cannot be held against the back of the hand. The slide is dipped in the stain for 1 second immediately removed and rinsed for 5 seconds by waving gently in a vessel of clean tap water. It is then dried in the vertical position. Haemoglobin continues to drain from the smear during drying and leaves four distinct zones depending on the amount of haemoglobin left behind — A. at the upper thin edge little haemoglobin minute parasites such as young *P. falciparum* rings are best sought here. B. adjoining A the background is pale yellow most parasites are best seen here. C. central containing too much haemoglobin. D. at the lower thin edge the parasites and leucocytes are often well contrasted against the smooth yellow ground.

By this method correct diagnosis of the species of parasite may be made in a very high proportion of cases within 1½ minutes of first preparation of the smear and in comparison with a thin smear there is approximately a sixteen fold concentration of parasites. The author gives an account of the morphology of parasites stained by this method pointing out that while the advantage of speed is very great the disadvantages are so slight that diagnosis should seldom be in doubt.

C II

ROBERTS (J I) Field's Rapid Method of staining Malaria Parasites — *East African Med J* 1940 Sept Vol 17 No 6 pp 232-234

MICHELSON (Louis) & WILCOX (Aimee) A Rapid Thick Film Blood Stain. — *Public Health Rep* 1940 July 5 Vol. 55 No 27 pp 1221-1222.

The stain is prepared as follows —

A Preparation of Wright-Giemsa Solution from Giemsa Powder and Wright's Solution

Place 100 cc. of glycerine C.P. anhydrous, in a bottle of 1 liter capacity which has a tightly-fitted screw cap or stopper. Weigh accurately

1.515 gm. Giemsa powder (National Aniline Dye Co. N Co-3) and suspend in glycerine. Fit stopper tightly, cover entire bottle neck with a double thickness of wrapping paper and secure with large elastic bands. (These precautions are taken to prevent moisture from being absorbed by the Giemsa-glycerine mixture during the heating period in the water bath.)

Heat the bottle of Giemsa-glycerine mixture in the water bath at 55°-60° C for 2 hours, mixing well with a glass stirring rod at half-hour intervals. At each stirring, remove bottle from water bath. After 2 hours, remove from water bath and allow to cool. Then add 100 cc. of unfiltered Wright's Stain Solution (B) to the bottle of Giemsa-glycerine solution. Mix well by vigorous shaking and let stand overnight. On the next morning add 800 cc. of unfiltered Wright's Stain Solution (B) to the above mixture. Shake vigorously. Filter into a small bottle the amount of stain needed for a few days' staining. Stain requires no aging and can be used immediately.

B. Preparation of Wright's Stain Solution from Powder (National Aniline Dye Co.)

Place 1000 cc. of methyl alcohol, acetone free neutral, and preferably redistilled, in a bottle of 1 liter capacity which has a tightly fitted screw cap or stopper. Weigh accurately 2 gm. Wright's powder and dissolve in the methyl alcohol. Wrap the bottle in paper and store in a dark place protected from ammonia fumes for at least 1 month. At frequent intervals while stain is aging shake bottle vigorously. At the end of 1 month, test for staining properties. The Wright's Stain Solution must give satisfactory blood-cell staining before it can be used in the preparation of this Wright-Giemsa stain.

IMPORTANT—All ingredients must be of reagent quality preferably from freshly opened bottles. All glassware must be chemically clean and perfectly dry.

The stain is diluted 1 in 10 with distilled water buffered to pH 7.0. Thick films are stained for 10 minutes and washed in distilled water for one minute. Thin films may be stained in a similar way but should first be fixed in methyl alcohol and the stain should be poured over them while they are still wet with alcohol. A prolonged method, in which the stain is diluted 1 in 40 and staining is allowed to proceed for 45 minutes may also be used.

C 17

RJE, M. A. LILLIE (R. D.) & WILCOX (A.) American Azures in the Preparation of Satisfactory Giemsa Stains for Malaria Parasites.—*Public Health Rep.* 1940 July 12, Vol. 55, No. 28, pp. 1274-1278.

The supply of German stains to America has been interrupted, and the substitution of azure I or azure A (which have been considered identical) of American manufacture, for the azure I of Grubler has not yielded good results in the preparation of the Giemsa stain. The authors have therefore examined individually the staining actions, on malaria parasites, of the possible chemical constituents of Grubler's azure I made up in simple combinations with eosin. These constituents belong to the group of thiazin dyes, namely methylene blue, azure B, azure A, azure C, thionin and certain others. Methylene blue stains the cytoplasm well, but not the chromatin. azure B gives excellent results. azure A is not so good and the others are poor. Azure B with methylene blue in proportion of 1:1 to 1:4 with appropriate amounts of eosin, with or without a small quantity of azure A, give

very satisfactory results. The formulae of three satisfactory solutions are given of which perhaps the best is —

	Pure dye weight	Total dye weight
Azure B (estimated) 80 per cent	200 mgm	250 mgm
Azure A 90 per cent	50	55
Methylene Blue 87 per cent.	270	310
Eosin Y 93 per cent	500	537
Glycerin	50 cc	50 cc
Methyl alcohol	50	50

[The pure dye weight of Azure A is given in the original as 500 mgm. Evidence in the text shows this to be a misprint the correct amount is 50 mgm as stated above.]

It is pointed out that the proper synonym for German azure I is azure B not azure A as has been supposed. C H

SCHRETZENMAYR (A) Sternal Puncture in Malaria and Other Tropical Diseases.—*Far Eastern Assoc Trop Med C R Dixième Congrès Hanoi 26 Nov—2 Dec 1938* Vol 2 pp 99-110 With 6 figs on 3 plates

The claim is made by the author that sternal puncture is a simple procedure which may furnish very useful information and should be used as a routine diagnostic measure by those practising in the Far East. In malaria for example he states that in 27 patients suspected on clinical grounds he found confirmatory evidence from examination of the marrow of 19 although blood smears had revealed no parasites in districts where kala azar occurs there are many cases which can only be detected by this means [but see this *Bulletin* 1939 Vol. 36 p 1030 1940 Vol. 37 p 349] examination of the marrow in cases of hookworm anaemia will tell us when there is regeneration going on or whether the condition is aplastic for if the latter the prognosis is very grave. In South China acute leukaemia is liable to be confused with haemorrhagic smallpox examination of the sternal marrow will show in the latter a distinct increase in reticulo-endothelial cells—a point of much diagnostic value H H S

TURNER (Olga) Notes on the Preparation of Certain Medieinal Solutions for Intravenous Injections and Enemata used in the Tropics.—*Trans Roy Soc Trop Med & Hyg* 1940 June 27 Vol. 34 No 1 pp 109-113

This is a useful paper. It is pointed out that drugs for intravenous use which are issued in solid form should be used on the day on which they are dissolved in sterile distilled water the solutions should never be left to stand overnight. Pyrogen free distilled water should be freshly prepared preferably on the day of use in a pyrex all-glass apparatus of which details are given.

Antimony sodium tartrate is less toxic than the potassium salt. It can be sterilized by boiling without harm but must be freshly prepared. Quinine dihydrochloride solution can also be sterilized by boiling or in the autoclave it should not be stronger than 1 grain in 1 cc. Sodium bicarbonate solution must not be sterilized by heat as this converts the bicarbonate to the toxic carbonate the chemically

pure salt should be added to fresh cooled, double distilled water. Sodium citrate solution may be sterilized by heat.

It is pointed out that in preparing yatren enemas tap water must not be used and the vessels for storage must not contain any trace of acid. Solutions of yatren must not be boiled, as this causes decomposition. Cod liver oil enemas should be prepared as emulsions with gum acacia (not with the irritating tincture of quillaia) but in preparing bearmuth subgallate in olive oil or cod liver oil no emulsifying agent must be used. Instead, thorough grinding in a mortar during preparation, and thorough stirring with a suitable rod immediately before use are essential. C II

SICÉ (A) Le nourrisson européen sous le climat du Soudan français [European Infants and the Climate of the French Sudan.]—*Bull Soc Path Exot* 1940 Mar 13 Vol 33 No 3 pp 156-159

The climate of the French Sudan may be divided into a hot dry season from February to May a rainy season from June to October and a cool season from November to January. The period dangerous to infants is the hot dry season, when humidity is at its lowest (17 to 23 per cent daily average) and the temperature rises to 40 or 41°C. The heat regulating mechanism of infants is not so efficient as that of adults, and the body temperature of infants therefore varies considerably with that of the surrounding atmosphere. Particularly marked is the evaporation of fluid from the skin and mucous membranes, and in this connexion evaporation from the lungs is emphasized. The factors leading to heat stroke are therefore present and this may take certain forms—(1) slight with vomiting and diarrhoea (2) grave with restlessness rapid pulse and respiration high temperature and sometimes meningism (3) very grave with sudden onset leading to collapse and cardiac failure.

Remarking that many houses have been built on unsound lines, with neglect of the provision of verandahs and consequent overheating of the buildings the author points out the importance of raising the indoor humidity by means of bowls of water or even fine garden nebulizer sprays. In addition he emphasizes the necessity for providing drinking fluid to infants at the rate of 180 gm. per kgm. body weight each 24 hours during the first month of life. This is diminished to 122 gm. in the second month, whereas for an adult 40 gm. is enough in ordinary circumstances. Sweetened boiled water with or without fruit juice is recommended. In European infants thus treated, and in whom wise dietetic measures are taken the author has seen perfect health maintained. He has, however seen infants not so well protected die of heat stroke. C II

HASSELMANN KAHLEIT (Margaret) Ueber Menstruationsstörungen bei der gesunden weissen Frau in den Tropen. [Menstrual Disturbances in Healthy White Women in the Tropics.]—*Arch f Schiff's u Trop Hyg* 1940 Mar Vol 44 No. 3 pp 124-133. [23 refs.]

In the Philippine Islands menstruation in white girls commences usually between the ages of 9 and 12 years in native girls between 11 and 14. The commonest menstrual disturbance of healthy women in Manila is oligo-menorrhoea [presumably this means oligomenorrhoea

or amenorrhoea] and this is more often found in white women than in Chinese Japanese or natives. Manila is free from malaria and the question of the effect of quinine on menstruation does not therefore arise neither is there any question of malnutrition. Of 251 white women 30 per cent. had oligo-amenorrhoea and in no case was there any genital or other disease to account for it. Normal menstruation was re-established on return to a temperate climate.

Associated symptoms include a sensation of fulness in the pelvis headache and even symptoms suggesting heatstroke. There is a strong psychological element and symptoms usually associated with the menopause may occur in young women. To exclude pregnancy the author uses her own modification of the Cuboni test.

In treatment the author has used Agomensin and more recently Progynon B. These are given during the period 14 to 10 days before the calculated time at which menstruation should occur and are continued in this way for 4 or 5 months. The author claims (without however giving details of her results in the series) that this does not seem to be a question of substitution therapy but rather a true causal therapy. With Theelin Progynon Uden Folliculin and Estrogen the results have not been satisfactory and vitamin and thyroid medication was unsuccessful.

Oligo-amenorrhoea does not appear to influence fertility and sterility may of course occur in those with normal menstruation. In these vitamin E therapy may be useful.

The author considers that the climate of the tropics exerts an influence on the ovaries and pituitary and advises that women who show menstrual disorders particularly oligo-amenorrhoea in temperate climates should not live in the tropics for long periods but these menstrual disorders do not appear to lead to any permanent damage.

C II

LEE (Douglas H. K.) & COURTICE (R.) *Assessment of Tropical Climates in Relation to Human Habitation.*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1940 Apr 30 Vol. 33 No 6. pp 601-614. With 6 figs. (1 map on plate) [11 refs.]

This paper deals with the assessment of climate from the thermal standpoint. It is recalled that the environmental factors which affect the loss of body heat and the maintenance of thermal equilibrium within the body are the temperature humidity and rate of movement of the air and the radiation from the surroundings. A scale of warmth which combines the first three of these in a single index but neglects radiation is effective temperature.*

It is remarked that in a large land area passing from temperate to tropical regions any climatic index should show a high degree of correlation with latitude when corrections have been made for altitude. The authors have calculated the effective temperatures (assuming still air) for 9 a.m. in the hottest months of the year the coldest months and the averages for the year for each of the recording stations in Queensland and the Northern Territory of Australia and have corrected these figures as well as the dry bulb temperatures for altitude. They have then correlated each of these against latitude. Separate

* The effective temperature of an atmosphere connotes the temperature of still air saturated with moisture in which the subjects of certain American experiments experienced the same feeling of warmth as in the atmosphere in question.

sensitized the guinea pig and the injections on the fifth day killed it by anaphylactic shock. In man urticaria may be produced within a few hours of the bite. C II

BOESORIE (Chasan) Vlachvergiftiging door een ikan nogi-nogi. [Fish Poisoning by Nogi-nogi (*Tetrodon argenteus*)]—*Geneesk Tijdschr v Nederl Indie* 1940 May 21 Vol 80 No 21 pp. 1338-1340 [Summary appears also in *Bulletin of Hygiene*]

The fish which caused the poisoning was identified as *Tetrodon argenteus*. It together with other fish was cooked and eaten by nine persons, 4 adults and 5 children. Those who partook of the other fish were slightly affected, owing it is stated to poison carried over from the *Tetrodon*. One adult and one child died within two hours of the onset of symptoms. The symptoms detailed in the case of one man who was seriously ill but recovered are described. He complained of a sensation of swelling of lips and tongue making speech difficult, there was much salivation and his limbs went to sleep after about two hours. There was a sensation of burning in the stomach, his breathing grew laboured and he was cyanosed and drowsiness increased with tremors. Coramin was administered. He felt drowsy for a week, the tongue symptoms persisted for two days. The poison seems to be present in the mucus which covers the fish and it has a neurotoxic action. [The post-mortem appearances are not recorded.] H H 5

SURIN (Charles Edward) Epidemiology of Acute Coccioidomycosis with Erythema Nodosum ("San Joaquin" or "Valley Fever")—*Amer Jl Public Health* 1940 June Vol 30 No 6 pp 600-611 With 4 figs. [27 refs.]

This is a careful epidemiological study of what is known as San Joaquin fever or by its synonyms Valley fever, Desert fever and Desert rheumatism [see this *Bulletin* 1939 Vol 36 pp 507-8]. The disease usually presents an influenza like initial phase, and after an interval which may be as short as two or as long as eighteen days an eruptive phase of erythema, nodosum or multiforme with at times an arthritis and phlyctenular conjunctivitis. In one to three weeks the rash fades but the affected areas may remain pigmented for months. No fatal case is recorded. In 1938 it was shown to be due to *Coccidioides immitis*. The incidence is greatest in the counties of Tulare and Kern California, and in a period of 17 months December 1937-May 1939 432 cases were observed. The organism may be found in the sputum (but many patients have ceased to expectorate by the time they come for treatment) and proved by culture and by animal inoculation. Some four-fifths of the patients do not present themselves until the rash appears. The period of incubation ranges between one and three weeks most commonly two weeks. Sensitivity to coccidioidin is established usually within a fortnight of the onset of symptoms and may be as early as two days or as late as seventeen. The allergy after attack is of long duration. One case is mentioned in which a very strong reaction followed the injection of 0.1 mgm coccidioidin though 9 years had elapsed since the known infection and only two of the 432 patients were said to have had a previous attack and one of these is not absolutely certain.

Infection is generally acquired by inhalation of the fungus spores and it does not pass from person to person. Instances are given in

which sharing a bed with a patient did not result in transmission of infection in other words the endosporulating spherules of *Coccidioides* which occur within the animal host and are found in the sputum are rarely if ever infectious. Responsibility lies with the chlamydospores characteristic of the fungus in nature and readily adapted to widespread dissemination. As regards seasonal prevalence fewest cases occurred in the wet season with little field work in the hot summer and autumn irrigation ceases dust is troublesome and cases increase. For example of 344 cases in 1938 73 occurred in the first six months and then in successive months 36 52 41 65 43 34 or 271 in the latter half of the year. In January 1939 there were only 11 and in January 1938 10. Social and economic conditions seemed to play no part newcomers are mostly attacked half the patients had been in the Valley less than a year and two-thirds less than two years. Tests with coccidiordin show that more than half of 2718 school-children in Kern county schools reacted positively and the percentage rose progressively from 17 among those who had resided in the county for less than one year to 77 among those of 10 years residence.

The influenza like onset may lead to erroneous diagnoses of influenza bronchopneumonia tuberculosis and others and the rash to measles or smallpox. Only some five per cent of those infected develop erythema nodosum so the 432 patients probably represented 8 000 or more new infections.

H H S

PROBIAS (C) Rhinosporidial Infection in Siam. (Report of Two Cases).—*Far Eastern Assoc Trop Med C R Dixième Congrès Hanoi 26 Nov-2 Dec 1938* Vol 2. pp 135-139

Two cases are recorded both in Siamese farmers aged 20 and 21 years in different districts in Siam. Surgical removal resulted in their leaving hospital in good health. Though not uncommon in India the disease is rare in Siam these being the only two cases seen in the course of 13 years work at the Siriraj Hospital. It is for this reason that it was thought to be worth putting on record.

H H S

RAM (Tehf) Prontosil Album in Gangrenous Stomatitis.—*Indian Med Gaz* 1940 Mar Vol 75 No 3 p 162.

The patient a boy of 10 developed gangrenous stomatitis while in hospital with symptoms resembling dysentery. Sloughing and foul ulcers were found on both upper and lower gums and glossy oedema of the cheeks was present. Treatment with pure nitric acid locally and mouth washes was given and 4 tablets [presumably each of 0.5 gm] prontosil album were given daily to a total of 14. Within a week the gums were healthy a remarkable result in a condition which in the author's experience in the past had invariably proved fatal.

C W

TROWELL (H C) The Recognition of Nutritional (Tropical) Macrocytic Anaemia in Uganda and its Previous Confusion with Malarial Splenomegaly and Splenic Anaemia.—*East African Med J* 1940 Apr & May Vol. 17 Nos 1 & 2. pp. 14-29 60-70 With 1 fig [21 refs.]

The author believes nutritional macrocytic anaemia to be relatively common although seldom diagnosed in E. Africa and after summarizing current views on nutritional anaemias and reviewing standard

wants to receive. The author then gives a short general account of what is meant by an insect and a brief outline of the way in which these things live. He then passes on to "Notes on the orders of insects" how and where to collect them. His intention is to help the man in the field to recognize members of the different orders and even some of the more important families. The admirable line drawings will certainly assist but one may doubt whether it is possible in so short a space to do anything of value. Classification is so large a subject and demands such a considerable knowledge of anatomy that it might perhaps have been thought better to refer the reader to one or two well-known books.

The remainder of the book is excellent. It consists of practical notes on methods of collecting, storing, posting, labelling etc. It is full of useful well tried hints and tips though it cannot in the nature of things be complete. It includes a number of rather specialized apparatuses such as Berlese's funnel and Williams's light trap.

P. A. Burton.

JOHNSON (C. G.) Development, Hatching and Mortality of the Eggs of *Cimex lectularius* L. (Hemiptera) in Relation to Climate, with Observations on the Effects of Preconditioning to Temperature.—*Parasitology* 1940 June Vol. 32. No. 2. pp. 127-173. With 13 figs. [30 refs.]

This paper which is part of a wider programme on the ecology of the bed-bug contains a mass of experimental data on the relations of the eggs to climate. The following points have been selected as being of most general interest.

Room temperatures in England are often between 0° and 13°C. for many months at a time. Many of the experiments directed towards finding the longest possible time an egg can survive and the lowest possible temperature at which it can hatch, have been made over this part of the temperature scale. Early embryonic development occurs within the female so that eggs laid soon after a meal take longer to hatch than those laid later (9½-6 days at 23°C.) This time is not influenced by atmospheric humidity. When eggs are laid at 23°C. the lowest temperature at which complete development and hatching can occur is 13°C. but eggs allowed to develop at this temperature or over can still hatch at 8°C. and some development may occur as low as 4°C. At 13°C. complete development and hatching only takes place when the relative humidity is between 75-80 per cent. Humidities of 90-100 per cent cause a high mortality. Eggs kept at 1-15°C. can survive some time and still hatch if the temperature is subsequently raised. They survive longer if the temperature is near 13°C. and it is estimated that the longest possible period of survival which occurs at about 12°C. is nearly 80 days. F. B. Wigglesworth

ZUMPT (F.) Ueber neuere Untersuchungen zur Rolle der Bettwanzen als Krankheitsüberträger. Mit einem Beitrag zur Terminologie der Krankheitsübertragung durch Tiere. [Recent Investigations into the Role of the Bed Bug in the Transmission of Disease.—*Zeits. f. Bakt. I Abt. Referate* 1940 Apr 11 Vol. 138. No. 19/20. pp. 401-414. [63 refs.]

MACFIE (J W S) The Genera of Ceratopogonidae.—*Ann Trop Med & Parasit* 1940 Apr 30 Vol 34 No 1 pp 13-30

ZAVATTARI (Edoardo) L'aeroplano quale trasportatore di insetti vettori o attori di malattia [Transport of Insect Disease Vectors by Aeroplane].—*Riv di Biol Colon* Rome 1939 Dec Vol. 2. No 6 pp 425-429 English summary (4 lines)

The author basing himself on the observations of Sarel WHITFIELD made in the Khartoum Airport reports the possibility of transport of insect vectors and agents of disease into Italy by air. He proposes some researches in the Airport of Lattorio in Rome in order to verify the importance and extent of such transports

Scabies Notes on a New Method of Treatment. Bwele Inzila Impya Ya Ku Silika. 1 p leaflet Revised [Sent to the Bureau by the DMS Northern Rhodesia]

The original leaflet noticed in this *Bulletin* 1940 Vol. 37 p. 230 contained an error in stating that after boiling 3 lbs of slaked lime and 3 lbs of sulphur together in a 4 gallon petrol tin filled with water the sediment should be discarded and the clear liquid used as a paint for the treatment of scabies. It should have stated that before use both the sediment and the clear liquid should be well stirred together and that the mixture should be used. In sending a copy of the revised leaflet to the Bureau the Director of Medical Services Northern Rhodesia writes that this method of treating scabies has been developed in connexion with what are known locally as itch campaigns and that these campaigns which are the beginning of medical work undertaken by the Native Authorities on behalf of their own people have proved very popular and on the whole very successful.

R L S

TALIAFERRO (William H) The Mechanism of Immunity to Metazoan Parasites.—*Amer J Trop Med* 1940 Mar Vol. 20 No 2. pp 169-182 [16 refs]

KIRKLAND (W B) Endemic and Epidemic Diseases in the Northern Territory.—*Health Canberra* 1939 Nov Vol. 17 No 11 pp 121-127

REVIEWS AND NOTICES

CANTON (N A.) [M.B. D.P.H. Municipal Health Officer] ROSEDALE (J L.) [Ph.D. D.Sc. F.I.C. Professor of Biochemistry King Edward VII College of Medicine] & MORRIS (J P.) [Assistant in Biochemistry King Edward VII College of Medicine] *Chemical Analyses of the Foods of Singapore*—191 pp 1940 Singapore S.S. Government Publications Bureau General Post Office Fullerton Building [\$4 or 9s. 4d] [Review appears also in *Bulletin of Hygiene*]

The work of Professor Rosedale on the analyses and nutritive values of Malayan foods is well known to readers of this *Bulletin*

years in whom the enlargement was even less and for this the explanation is offered that the condition may have been physiological, associated with the onset of puberty. In view of this it seems hardly necessary to postulate an "endocrinotropic strain of *Trypanosoma cruzi*" on the contrary on such flimsy evidence as this, it can tend only to complicate the problem.

A section is devoted to diagnosis, divided into clinical and laboratory methods—the former based on symptoms, the latter on examination of blood-smears, on the results of animal inoculation, on xenodiagnostic methods, and the Machado-Guerreiro complement fixation test. The work is authenticated by a fairly full bibliography of local (Uruguayan) and of foreign (non-Uruguayan) references. Photographs of patients and photomicrographs of tissue changes are well reproduced and there are two fine coloured plates, one depicting *Trypanosoma rubrocris* and *T. infestans* the other several forms of *Trypanosoma cruzi* as seen in human blood.

H H S

ARMY MEDICAL LIBRARY WASHINGTON. Microfilm Service of the Army Medical Library Washington, its Purpose and Plan of Operation, together with a List of More than 4,000 Abbreviated Titles of Medical Periodicals currently received by this Library September 1940—28 pp. Washington 7th St and Independence Avenue

The Librarian of the United States Army Medical Library wishes attention to be drawn to a microfilm copying service that has recently been established through the generosity of a group of Friends of the Army Medical Library. The service is operated within the Library on a non profit basis solely for making the extensive medical literature collections of the Army Medical Library available to many medical research workers at a distance from Washington who are unable to go in person to consult them. It provides photographic copies on cinematograph films of separate articles not exceeding 30 pages at a charge of 30 cents for each complete article not exceeding 30 pages in length and 10 cents for each succeeding 10 pages or fraction thereof. These microfilms are of the standard 35 mm size with images of the printed pages photographed upon them in sequence and can be read with the aid of a magnifier enlarging to five or more diameters or by means of a projecting apparatus. For filing purposes they can be attached to sheets of paper or if desired, photoprint enlargements legible without mechanical aid can be made from them at a small cost. In these times, when many are experiencing so much difficulty in obtaining medical journals from abroad this service should prove of especial value. A circular describing the service and giving a list of the 4 000 or more periodicals received by the Library will be supplied on request from "Microfilm Service" Army Medical Library 7th Street and Independence Avenue S.W. Washington D.C. U.S.A.

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The bracketed abbreviations after the page numbers indicate the subjects.
Page numbers within brackets indicate papers not summarized.

Am.	signifies Amoebiasis and Amoebic Dysentery
Bb.	Beriberi.
Bl.	Blackwater
B.R.	Book Review
Chl	Cholera
Der	Tropical Dermatology
Diet.	Deficiency Diseases including Epidemic Dropsy
Dys.	Dysentery (Bacillary and Unclassed)
Fev	Fevers.
Hel.	Helminthiasis.
Leish.	Leishmaniasis
Lep.	Leprosy

Lept.	signifies Leptospirosis.
Mal.	Malaria.
Misc.	Miscellaneous.
Oph.	Tropical Ophthalmology
Pel.	Pellagra.
Pl.	Plague.
Rab.	Rabies.
R.B.F.	Rat Bite Fever
Rep	Medical and Sanitary Reports.
R.F.	Relapsing Fever and other Spirochaetoses.
Sp	Sprue.
Tryp	Trypanosomiasis.
Vms	Venoms and Antivenenes.
Y.F.	Yellow Fever
Y & S	Yaws and Syphilis.

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 Black, W T., Jr 515 (Vms.)
 Blacklock, D B., 25 (Y & S) 294 (Mal.)
 — & Southwell, T 820 (B.R.)
 Blanc, G & Baltazard M., 269 572, 573 580 (Fev)
 — Martin L. A & Baltazard M., 262 (Fev)
 Blankenbom M A. with Koozer 440 (Pel.)
 Blömer H W., with Cansan 725 (Am.)
 Blüeth, A 47 (Lep)
 Bobes, S with Proca, 618 (Rab.)
 Bock, E. 53 (Mal.)
 Bodrogi, G & Makara, G., 114 (Am)
 Bõe J 117 725 (Am.)
 Boecker E. 193 (Rab)
 Boenjamin, R., 46 627 (Lep)
 Boesioire, C. 882 (Misc.)
 van Bogaert, L. & Van den Berghe, 802 (Pel.)
 Boletín Sanitario Buenos Aires, (285) (Mal.) 424 (Fl.) (662) (Hel.)
 Bologna, M. 298 (Hel.)
 Bolognesi G 212 (Hel.)
 Bolus M., 108 (Der)
 Bombay 28 (Sp) (48) (Lep.) 292 bis (Mal.)
 Bonanno A M. 374 (Dys)
 Boné G., 203 611 bis (R.F.)
 Bonne, C. 490 (Hel.)
 — & Lie Kian Joe 220 (Hel.)
 — & Sandground J H 487 491 (Hel.)
 Bonne-Wepster J 303 (Hel.)
 — & Brug, S. L. 303 (Hel.)
 Bonnia H. & Aretas R. 115 727 (Am)
 von Borsdorff B., 215 216 (Hel.)
 Boquet, P., 461 (Vms.)
 — with Césari 462 467 (Vms.)
 de Borchgrave, O 406 bis (Tryp.)
 Borda, J M. with Castex & Camponovo (430) (Pel.)
 Boes, I B Minkerj, B & Chopra, R. N 458 (Mal.)
 Boston R. J 842 (Fev)
 — with Bowdoin, 842 (Fev)
 Bowwell C. with Senekj & Beattie, 479 (Hel.)
 Boto D., with Lorenzo 213 (Hel.)
 Botreau-Roussel, 26 (Y & S)
 Botsford, T W Hudson H W Jr & Chamberlain, J W., 648 (Hel.)
 Botzaria, A. 347 (Leish.)
 Boulanger P with Lavie Barlety & Caroh, (183) (Hel.)
 Bourroul, C., (862) (Hel.)
 Bourneil, J C. & Wornall, A. 19 (Tryp)
 Bowdoin, C. D & Boston, R. J 842 (Fev)
 Boyd G H. & Dunn, M., 186 (Mal.)
 Boyd M. F 498, 666 739 863 884 (Mal.)
 — & Earle, W C. 288 (Mal.)
 Boyé, R. 737 (Mal.)
 Bozbenko V P with Jurchak, 295 (Mal.)
 Bozicevich, J., with Wright & Brady 649 (Hel.)
 Brackett, S 149 (Hel.)
 Bradfield E W C. 73 (B.R.)
 Brady F J & Wright, W H 299 (Hel.)
 — with — 649 (Hel.)
 — with — & Bozicevich, 849 (Hel.)
 Bramwell C. with Jones, 315 (Bb.)
 de Brauwere, 308 (Tryp) 522 (Misc.)
 Braxxville Afrique Equatoriale Française 198 (Rab) 253 263 (Fev) 403 (Tryp) 550 (Y.F.)
 Breazale, with Greene 184 (Rab.)
 Brett, G A 203 (R.F.)
 Briceño-Iragorry L., 108 (Der)
 Briceño Rosen, A. L. & Iriarte, D R., 105 bis (Tryp)
 Brercliffe R. 558 (Y.F) 624 (Lep) 694 (Tryp)
 British Medical Journal, (581) (Fev)
 Broager B with Bing 33 (Sp.)
 Brochen, L. with Roban 402 (Tryp)
 Broom, J C & Brown, H C. 708 (Tryp)
 Brown, H C 379 (Misc.) 643 (Lept.)
 — with Broom, 708 (Tryp)
 Brown, H. P & Austin, J A., 657 (Hel.)
 Brug, S. L. 728 (Am)
 — with Bonne-Wepster 303 (Hel.)
 Brull, L. with Lambrechts, A. & Barac, G., 34 (Sp.)
 Brumpt, E., 104 bis (Der) 140 (Tryp) 200 (R.F.)
 — & Brumpt, L. C. 201 (R.F.)
 — & Lavie G 151 (Hel.)
 — Mazzotti, L. & Brumpt, L. C., 141 (Tryp) 201 (R.F.)
 Brumpt, L. with Herr 146 (Tryp.)
 — 772 (Leish.)
 — with Brumpt, E. & Mazzotti, 141 (Tryp) 201 (R.F.)
 — with Duvoir Pollet & Chénobault, 596 (Hel.)
 — with Pinard, 18 (Tryp.)
 Bruneau with Rivolen & Rennevez, 578 (Fev)
 Bruni, A., 592 (Hel.)
 — & Buda, L. 196 (Rab)
 Bruxelles, 637 (Lep)
 Bruynoghe G., 857 (Hel.)
 Buech, S with Reiller & Marberg 259 (Fev)
 Buda, L. with Bruni, 196 (Rab)
 Budimko F A. with Danjova, 505 (Mal.)
 Bulletin de l'Office International d'Hygiène Publique 88 (Y.F) 865 (Mal.)
 Buonomin, G 783 (Mal.)
 de Burca, B., 56 (Mal.)
 Burgdorf, A. L. & Barry T A., 35 (Sp.)
 Burkitt, R. W 868 (Dys.)
 Burnet, E. Cuenod, A. & Nataf, R., 448 (Oph.)
 — & Roussel, H., 873 (Oph.)
 — & Jaffard, H. 331 (Lep)
 Burnet, F M. & Freeman, M 563 (Fev)
 — Derrick, E H & Smith, D J W 253 (Fev)
 Burchkies, K., 45 (341) (Lep.)
 Burt, B D., 684 (B.R.)
 Butler R. E with Sebreil, 438 (Pel.)
 Buxton, P A. 169 (B.R.) 379 527 (Misc.)
 Byam W., 379 (Misc.)
 Byron, F E., 233 (Misc.)

C.

- Caccagnoli, R., 518 (Vms)
 Cain, A. & Sukorav H. 377 (Dys)
 Calcutta, 717 (Chl) 744 (Mal)
 Calcutta Medical Journal 282 (Chl)
 Caldwell A. F. 814 (Muc)
 Calomero, R., 352 (Muc)
 Camara, S. F. with Concepcion & Folgeron,
 B. 630 (Lep)
 — with — Paulino & Gargantano, 753
 (Bb)
 Camargo, A. T. & Bechbell L. M. 39 (Lep)
 Camarero A. F. (590) (Hel)
 Cambodédes H. (44) (Lep)
 Camboernac F. J. C. & Hill R. B. 784 (Mal)
 Campbell, S. B. & Allison, R. B. 803 (Pel)
 van Campenhout J. 83 (A. F.)
 Camponovo L. E. with Caster & Borda,
 (430) (Pel)
 Campos, N. S. 338 (Lep)
 — & Alayon, F. 42 (Lep)
 Canaan, T. & Bömer H. W. 725 (Am)
 Canclallos A. with Lavedas & Valerae, 291
 (Mal)
 Canet, J. with Farmanad, Lataso &
 Baccalione 188 (Mal)
 — with Tommasoff 680 (Mal)
 Canzato, R. 790 (Mal)
 Cantou, N. A., Rosedale J. L. & Morris
 J. P., 687 (B.R.)
 Caranacoua, P. with Lorando, 574 (Fev)
 Carasaga, O. with Pasneca-Podanco 804
 (Mal)
 Carra, A. (715) (Tryp)
 Carmichael, J. 824 525 (Muc)
 Caroh, J. with Justin-Bouquon & Labona,
 31, 35 (Sp)
 — with Lavner Baroty & Boulauger (153)
 (Hel)
 Caruso, M. 236 (Muc) 564 (Fev)
 Carr H. P. Meléndez J. F. & Roe A. 684
 (Mal)
 Carrasquillo, R. B. 86 (Der)
 Carrón A. L. 95 (Der)
 Carals-Ariet J. & Webster L. T. 622 (Rub)
 Carusi, G. 83, 132, 263 (Mal)
 Casquesro A. 791 (Mal)
 Castaneda, M. R. 61 (Fev)
 — & Silva, R. 259 (Fev)
 Castellana, V. 98 (Der) 175 (Mal) 312 (Bb)
 379 381 810 (Muc)
 Carter, M. R. (118) (Am)
 — Camponovo, L. E. & Borda, J. M.
 (430) (Pel)
 — & Di Cao, A. V. 123 (Am)
 — Maggi, A. & Orsico G. 589 (Hel)
 Cartryck, R. with Akar Maril & Muzo,
 150 483 (Hel)
 Catani A. 86 97 (Der)
 — & Greuterboley J. 97 (Der)
 — with Sergeant Ed. Sergeant Et &
 Parrot, 179 (Mal)
 Casey O. R., 807 (Mal)
 — with Wotton, 672 (Mal)
 Cavallero, C. 585 (Mal)
 Cayla, with Lewé & Lichtenberger 361 (Mal)
 Ceccaldi, J. with Lwof 15 (Tryp)

- Cehk, O. S. 787 (Lesh), 841 (Fev)
 Ceba, A. & Modina, M. 120 (Am)
 Ceban, E. & Boquet, P. 462, 467 (Vms)
 Ceylon, 403 (Mal)
 Chabaud, A. 12 (Tryp) 50 (31) (Lep)
 (R.F.)
 — with Berry 50 (Lep)
 Chamberlain, J. W., with Botaford & Haw
 843 (Hel)
 Chanay, C. & Conjard, R., 783 (Bb)
 Chandler A. C., 218 481 (Hel)
 Chandra, H. 590 (Hel)
 Chang, S. K. F. with Chang, Khoo, &
 119 (Am)
 Chang, S. with Sem, 773 (Lesh)
 Chang, T. L., (286) (Mal)
 — with Tommasoff & Try 651 (Hel)
 Chatterjee, H. N. 278, 282 (Chl)
 Chatterjee, S. C., 130 (Mal)
 Chatterji, K. R., with Muir 325 (Lep)
 Chatterji, S. N. with Dharmendra, 343
 (Lep)
 — with Lowe, (47) (Lep)
 Chavez Goyenches, A. (602) (Hel)
 Chénobault, J. with Duvour Polet
 Brumpt, 586 (Hel)
 Chesterman, C. C. 7 700 (Tryp)
 Chew B. (632) (Lep)
 Chiarotti, C. 217 (Hel)
 Chiffet, A. 212, 586 (Hel)
 Chin, K. 814 (Vms)
 Chin, T.-H. with Winfield, 728 (Am)
 Chin, Y. T. 177 (Mal)
 Chinn, V. R. with Duggan, 874 (Oph)
 Chire, G. D. with Sothay & Gokhale,
 (35)
 Chiu, P. T. 340 (Bt.)
 Cho, R. 836 (Bt.)
 Chodro, W., 375 (Dys)
 Chopra, R. N. & Badhwar R. L., 678 (Al)
 — & Rao, B. C. 85 503 (Mal)
 — — & Sen, S. 303 (R.B.F.)
 — with Boso & Makery, 456 (Mal)
 — & Chowhan, J. S. 466, 518 (Vms)
 — Das Gupta, B. M., Sen, B. & Ahmed
 377 (Dys)
 — — & Hayter R. T. M.,
 (Mal)
 — Hayter R. T. M. & Sen, B. 803 (A)
 — Marmadar, D. C. & Roy A. C.,
 (Diet)
 — Paricha, C. L. & Banerjee, K.,
 (Diet)
 — — & Lal, S. 568 (Hel)
 — & Rao, B. S. 656 (Hel)
 — Roy D. M. Hayter R. T. M. &
 B. 746 (Mal)
 Chorine, V., 80 (Lep)
 — with Marchoux, 49 (Lep)
 Chorin, P. 459 (Mal)
 Chow, C. Y. with Hsu, 151 (Hel)
 Chowhan, J. S. with Chopra, 466 518 (V)
 Christophers, R., 379 (Muc) 848 (Fev)
 Christophers, S. R., 174 (Mal)
 — & Falton, J. D. 180, 745 (Mal)
 Chu, P. T., with Yuen & Lee, 246 (Lesh)
 Chu, J. Chang, Lin & Wang, 789 (Mal)
 Chub, G. M. & Panikova, E. A., 130 (Mal)

Chung H L. Khoo F Y., Chang S K. P & Ma, W S., 119 (Am.)
 — Liu Wang, C. W & Chu I 789 (Mal.)
 — with — 261 bis (Fev)
 — & Wang, C. W 769 (Lelah.)
 — with Wang 769 (Lelah.)
 Ciavaklini 837 (Bl.)
 di Cio A. V. with Cartex, 123 (Am.)
 Ciuca M. with Ionesco-Mihaesti, Balteanu & Combiesco 255 (Fev)
 Clapham, P. A., (214) (Hel.)
 Clark, H. C. Komp W H W & Jobbins D M., 668 (Mal.)
 Claudian, I. with Grecu Ionescu & Constantinescu 441 (Pel.)
 — with Ionescu & Constantinescu 446 (Pel.)
 Clausen N M., with Longley & Tatum 12 (Tryp)
 Cleave, T L. 257 (Fev)
 Cockey H. M. Sydenstricker V P & Geeslin, L. E., 442 (Pel.)
 Clemens, H. H. & Barnes M L. 817 (Misc.)
 Cleveland, D E. H. & Turvey S E. C., 186 (Mal.)
 Clover F W P 866 (Mal.)
 Courtney G R., with Young & Stubbs 783 (Mal.)
 Cochrane, R. G. (330) 635 (Lep)
 — Pandt, C. G. & Menon, K. P 331 (Lep.)
 — Raj M. P. & Roy E., 342 (Lep)
 Coggeshall, L. T., 670 bis (Mal.)
 — with Eaton, 368 bis (Mal.)
 Cohen, W 874 (Misc.)
 Colas-Beaucour J & Romafia, C. (347) (Lelah.)
 Collier D R. with Oberdorffer (42) 47 (Lep)
 Collier W A. with Mochtar 644 (645) (Lept.)
 Collignon, E. (507) (Mal.)
 Colonial Development Fund Scheme, 685 (Tryp)
 Combiesco D. with Ionesco-Mihaesti Ciuca & Balteanu, 255 (Fev)
 Concepcion, I. & Camara, S. F. with Fulgencio B., 630 (Lep.)
 — & Paulino P. with Camara, S. F. & Gargantano, M. L. 755 (Bb.)
 Congo Belge 397 398 (Tryp) 419 (Pl.) 522 (Misc.)
 Connell, F. H. & French, H. T. 111 (Am.)
 Connell, W K., 813 (Misc.)
 Constantinescu, P. with Grecu Ionescu & Claudian, 441 (Pel.)
 — with Ionescu & Claudian 446 (Pel.)
 Coon A. B. 406 (Tryp)
 Coppola M. A., 601 (Mal.)
 Cordoba, 237 (B.R.)
 Cornejo A. with Marza, 229 (Misc.)
 Corradetti A., 368 bis 452, 665 743 (743) 769 Arr (Mal.)
 Corson, J. P., 9 10 (Tryp.)
 Costa, A. 588 (Hel.)
 da Costa, A. M. 194 (Rab)
 Costa, H. M., with de Almeida, (46) (Lep)

Costa, R. S. & Salveraglio F J., 516 (Vms.)
 — with Talco & Miranda, (145) Tryp)
 — with — & Onmanl 145 (Tryp)
 — with — Rial & Osmani, 889 (B.R.)
 Coulard R., with Champy 753 (Bb.)
 Courtice, R., with Lee 879 (Misc.)
 Cova-Garcia, P., (500) (Mal.)
 Covell, G., (188) 598 866 (Mal.)
 — & Afridi, M. K., 747 (Mal.)
 — & Harbhagwan, 740 (Mal.)
 Cowdry E V., Ravold, A. & Packer D M. 50 (Lep)
 Cowen D. with Wolf & Palge 236 (Misc.)
 Cox, G. W. with Parker Kohla & Davis 234 (Fev)
 Cox H. R. 254 268 832 (Fev)
 — & Bell, E. J. 562, 580 (Fev)
 Cracium E. with Danielopolu 566 (Fev)
 — with — Lupo & Petresco 567 bis (Fev)
 Craig C. F., 791 (Mal.)
 Craig G. M. 115 (Am.)
 Cram, E. B. & Folan, J. P., 480 (Hel.)
 — & Nolan, M. O., 300 (Hel.)
 Crook, R. L. 177 (Mal.)
 Cros, R., 496 (Mal.)
 Crowell, R. L., 861 (Mal.)
 Crown Agents for the Colonies, 819 (B.R.)
 Crossland, C. 402 (Tryp)
 Cruveilhier L. 196 (Rab)
 Cufened with Burnet & Natal, 448 (Oph.)
 — with — & Rousset, 873 (Oph.)
 Culbertson, J. T. 406 (Tryp)
 — & Wotton, R. M. 407 (Tryp.)
 Curatolo A. with de Muro 871 (Dys)

D

Daengsvang S. 307 (Hel.)
 Dale H., 700 (Tryp)
 Dambowceann A. & Barber C. 721 (Chl.)
 Dang Van-Ngu 96 (Der)
 Danielopolu D. & Cracium, E., 566 (Fev)
 — Lupo M., Cracium, E. & Petresco M., 567 bis (Fev)
 Danilova, M. L. & Buduimko F A., 505 (Mal.)
 Danzel L. 427 (Pl.)
 Dartevelde, E. 150 (Hel.)
 Das, B. B. (723) (Chl.)
 Das, N. 636 (Lep)
 Das, P. C., with Lahuri & Malik, 718 (Chl.)
 — with Parricha, Lahuri & Paul, 276 (Chl.)
 Das Gupta, B. M., 184 (Mal.)
 — with Chopra, Sen & Ahmed, 377 (Dys.)
 — with — & Hayter 186 (Mal.)
 Dassanayake, W. L. P. 302 (Hel.)
 Davey J. B., 7 (Tryp.)
 Davey T. F. 48 624 (Lep)
 David, 22 (Y & S)
 Davis, G. E. 202 bis 639 (R.F.) 562 (Fev)
 — with Parker Kohla & Cox, 254 (Fev)
 — with Philip 640 (R.F.)
 — & Walker M. E., 640 (R.F.)
 Davis J. P. (441) (Pel.)
 Davis L. J. 207 (Lept.)
 Dawson, J. R. Jr 191 (Rab)
 Dawson, V. T., with Sanders 185 (Mal.)
 De M. N. & Tribedi, B. P. 232 (Misc.)
 — with — 749 (Diet.)

- De, N. K., with Dhamendra, 337 (Lep)
 De R. K., 801 (Mal)
 De S. S., 461 812, 813 (Misc)
 Deceert, P., Belfort, J. & Schneider J 135 (Mal)
 — Schneider J & Kerrest-Groscheit 438 (Mal)
 DeEds, F., with McNaught & Beard, 309 (Hel)
 Degotte, J., 43 (Lep)
 De la Barrera, J. M., 423 (Pl)
 Deland, C. M., 265 (Fev)
 Delance, E., 44 (535) (Lep)
 De la Paz, G. C., (233) (Misc)
 De la Ruzera, R. D. 570 (Fev)
 Delbore, P., 263 (Fev)
 — & Raynes, V. 573 (Fev)
 Delmotte H. 636 (Lep)
 Delperdange G. with Jadin 480 (Hel)
 Del Puente, E. (799) 860 (Mal)
 Del Rio, J. with Earle Perre & Arrola, 178 (Mal)
 Del Vecchio G. 743 (Mal)
 Desapiter G. 22 (A & S)
 Descele K., 632 (Lep)
 — & on Haller, E. 140 (Tryp)
 Desnon, G. A. & Dowling, J. D. 106, 621 (Rab)
 — & Leach, C. N. 621 (Rab)
 Desnoe C. C. with Gully, 205 (R.B.F.)
 Desnoe, E. W. with Lund 531 (Misc)
 Desrobert, L. 158 (B.R.)
 Derrick, E. H. with Barbet, Freeman & Smith, 253 (Fev)
 — & Smith, D. J. W. 851 (Fev)
 Descaux, J. (17) (Hel)
 — with Roeland, (217) (Hel)
 Deschere, R. 217 (Hel) 727 (Am)
 Desnoat, R. 825 (Pl)
 — with Lawson & Schoetter 828 (Pl)
 Desvire J. 709 (Tryp)
 Dey A. C. 813 (Misc)
 Dey S. C. with Mapstone 97 98 (Der)
 Dharmendra (328) 337 (Lep)
 — & Chatterji, S. N. 343 632 (Lep)
 — & De, N. K. 337 (Lep)
 — & M. Kherji, N. N. 628 (Lep)
 Dhamanti, G. 504 (Mal) 674 (Misc)
 Dias, E. (417) 712 (Tryp)
 — with Tra amoa, 874 (Fev)
 Dironnet, L. with Laod Querido & Garmier 435 (Fwi)
 Dikshat, 292 (Mal)
 Dikshat, B. B. 745 (Mal)
 — with Sokhey 828 (Pl)
 Dinger J. E. (95) (Y.F.)
 Dimnik, J. A. & Dimnik, N. N. 310 (Hel)
 Dimnik, K. N. 310 (Hel)
 Dincombe, G. with Vartan, 865 (Mal)
 Dyoehana, R. M. with Assen Tahar Eerkene & Sardjito, 788 (Lesh)
 Do Amaral, A. D. F. with Galvão, 507 (Hel)
 Dobladez, M. J. L. with Marra & Giordano, 714 (Tryp)
 Dobler M. with Heener 508 (Mal)
 Doffus, R., 214 (Hel)
 Dolmatova, A. V. with Shcharenkova, 281 (Misc)
 Dominguez, F., 679 (B.R.)
 Doull, J. A. & Magrill, E., 637 (Lep)
 Do-van-Hoanh, with Montol, 569 (Mal)
 — with — Le-Van-Phung & Tran-Van-Hanh, 43 (Lep)
 Dove, W. E., with Hall & Flatta, 225 (Misc)
 Dowling, J. D., with Denon, 196, 621 (Rab)
 Drummond, J., 863 (Dys)
 Drummond, M., 228 (Misc)
 Dubois, A., 153 (B.R.) 642 (R.B.F.)
 — with Gavrilov & Fester Mme 333 (Lep)
 — & Kohn, I., 410 701 (Tryp)
 — & Lomax S. 411 (Tryp)
 — & Pearson, Y. 193 (R.F.) 206 (R.B.F.)
 — & Radna, R., (47) (Lep)
 — & Rosceter R. 340 (Lep)
 — & Vitale, S. 308 (Hel)
 Dubovskoy, P. A. 351 (Lesh)
 Duggan, J. N. & Chinn, N. K., 874 (Oph)
 Dule, H. L., 11 (Tryp)
 Dumon, G. with Mattet, Giraud & Dumon-Lengre, Mme 348 (Lesh)
 Dumon-Lengre, Mme., with Mattet, Giraud & Dumon, 348 (Lesh)
 Duncan, D. 451 (Mal)
 Duncan, J. T. Martin, P. H. & Mergatroyd, F. 98 (Der)
 Dunn, M. with Boyd, 130 (Mal)
 Dupoux, R., Barbas, R., Antoine, A. & Gerah, M. T. 134 (Mal)
 Durand, P. & Giraud, P., 579 840 850 (Fev)
 — & Sparrow H. 849 (Fev)
 — & Sparrow H. 872, 849 (Fev)
 Durand, R., with Laigrot, 266, 267 508 (Fev)
 Duran, A., (287) (Mal)
 Durieux, C. with Peitler Jonchère & Argand, 82, 857 (Y.F.)
 Datta, S. C. with Hara, 69 (Hel)
 Deyour M., Poillet, L., Brumpt, L. G. & Chalmers, J. 696 (Hel)
 Dyer R. E. 671 (Fev)
 — with Lilie & Topping, 872 (Fev)
 — with Topping, 843 (Fev)
 Dyke, H. W. 329 (Lep)

E

- Earle H. G. 757 (B.R.)
 Earle K. V. 225 612 615 (Misc)
 Earle, W. C. 493 (Mal)
 — with Boyd, 258 (Mal)
 — Perre M. Del Rio, J. & Arrola, C., 178 (Mal)
 Eaton, M. D. & Coggeshall, L. T., 306 618 (Mal)
 Edward, D. G. with Nabarro, 362 (Mal)
 Edwards, F. W. O'Druid H. & Smart, J. 367 (B.R.)
 Eerkene, J. W. with Assen Tahar Dyoehana, & Sardjito, 788 (Lesh)
 Egypt, Ministry of Public Health, 450 (Oph)
 El Bakly M. A. 871 (Oph)
 El Ghazary A. with Alport & Ghaboussou, 457 (Fwi)
 Elche, J. with Farinard, 135 361 (Mal)
 Ellis, F. A. 406 (Tryp)

Elvehjem C. A. (805) (Pel.)
 — with Walsman, Mickelsen, & McKibbin,
 (797) (Pel.)
 Enders, J. F. with Zinsser & Plotz 580
 (Fev.)
 Ermakova N., 629 (Lep.)
 Etcheverry 46 (Lep.)
 Ethes Y. with Sice & Santet 857 (Mal.)
 v Euler H. & Schlenk, F. (436) (Pel.)
 Evans, E. F. 841 (Fev.)
 Evans, W. S., 192 (Rab.)
 Evers L. B., 309 (Hel.)
 Ewins, J. A. 700 (Tryp.)

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Fabiani C. (38) (Lep.)
 Fadel, A. E. L., 871 (Oph.)
 Faiguenbaum J. 504 (Mal.)
 Faulmerger T. R. & Spalding J. E. 308
 (Hel.)
 Fairley N. H. 309 833 (Bl.) 803 (Mal.)
 885 (Misc.)
 — & Murgatroyd F. 834 (Bl.)
 Far Eastern Association of Tropical Medicine
 539 (B.R.)
 Farinard E. & Elieche, J., 185 bis (Mal.)
 — Latarte, C., Baccalozze L. & Canet J.,
 186 (Mal.)
 — & Prost, P., 239 (Mal.)
 Farinard E. M. 128 (Mal.)
 Farinard M. E. 138 (Mal.)
 — & Prost, P. 494 (Mal.)
 Faust, E. C. 178 356 (Mal.)
 — with Watson & Simmons (53) (Mal.)
 — Sawitz W. Tobie, J. Odom V. Perea,
 C. & Lincicome D. R. 62 (Hel.)
 Favotte, G. O. 531 (Misc.)
 Federated Malay States, 131 284 (Mal.)
 620 (Rab.) 831 (Pl.) 847 (Fev.)
 Fein, H. D. with Jolliffe & Rosenblum 438
 (Pel.)
 Feissolle, L., with Raynal & Licoa, 720 (Chl.)
 Fenner F. J. 23 (Y & S.)
 Fernandez, J. M. M., 632 (Lep.)
 Fernandez Lascano F., with Talice Mourigán
 & Osmani 145 (Tryp.)
 Ferwerda, S. with Tenhaeff 591 (Hel.)
 Fester A. Mine with Gavrilov 333 (Lep.)
 — with — & Dubois, 333 (Lep.)
 Fici, V., 227 (Misc.)
 Flebiger W. & Tempel, D. (211) (Hel.)
 Field, H. Jr. & Robinson, W. D. 440 (Pel.)
 Field J. W. 808, 874 (Misc.)
 — & Le Fleming, H., 56 739 (Mal.)
 Findlay G. M. 848 (Fev.)
 — & MacCallum F. O., 93 bis (Y F)
 — with Murgatroyd & MacCallum 129
 (Mal.)
 Flinshtein, B. J. 621 (Rab.)
 Flinlayson, M. H. 518 (Vma.)
 — & Grobler J. M. 581 bis (Fev.)
 Flascher I. A., 677 (Misc.)
 Flarer F., 778 (Leish.)
 Floch H. Goerger F. & Tasque, P., 645
 (Lept.)
 Florasco P. with Gungold 130 (Mal.)
 Florman, A. L. & Haskenschuel, J., 845 (Fev.)

Folan, J. P. (300) (Hel.)
 — with Cram, 480 (Hel.)
 Fondé G. H. & Fondé E. C. 502 (Mal.)
 Foner A. 532 (Misc.)
 Foraco J., 193 (Rab.)
 Forster W. G. 872 (Oph.)
 Fournals 28 (Sp.)
 Fournier J. with Raynal 256 (Fev.)
 — with — & Vellot, 256 (Fev.)
 Fox, H. 105 (Dor.)
 Frataní, L. 496 (Mal.)
 Freeman M. with Burnet, 563 (Fev.)
 — with — Derrick & Smith 253 (Fev.)
 Freire, P., with Vargas 784 (Mal.)
 French, H. T., with Connell, 111 (Am.)
 Frimodt Möller C. 387 (Misc.)
 Frohne W. C. 181 (Mal.)
 Frostad S. 35 (Sp.)
 Frostag J. P., with Lewy Hilmwich & Spies,
 (444) (Pel.)
 — & Spies, T. D., 443 (Pel.)
 Frye, W. W. & Meloney H. E. 115 (Am.)
 — with — & Leathers, 115 (Am.)
 Fuchs H. & Wisselneck, A., 33 (Sp.)
 Fuente-Méndez R., with Talice (145)
 (Tryp.)
 Fuertes, F. & Pernichena, J. C., 334 (Lep.)
 Fulgencio B. with Camara & Concepcion,
 630 (Lep.)
 Fulton, J. D., 509 795 (Mal.)
 — with Christophers, 190 745 (Mal.)

G

Gabriel, W. B. 121 (Am.)
 Gaceta Medica de Caracas 231 (Misc.)
 Galizi, J. 870 (Dys.)
 Gallardo V. P. 714 (Tryp.)
 Galliard, H., 152, 489 650 (Hel.)
 — & Nguyen Huu Phiem, 305 (Hel.)
 Galvão A. L. & Do Amaral, A. D. F. 597
 (Hel.)
 Galati, M. T. with Dupoux, Bartheas &
 Antoine, 134 (Mal.)
 Garcia-Caparro, F. with Piaggio-Blanco
 589 (Hel.)
 Gargantano M. L. with Concepcion,
 Paulino & Camara, 755 (Bb.)
 Garner Mlle. with Lwoff, Querido &
 Digonnet, 435 (Pel.)
 Garra, G., 865 (Mal.)
 Gauchen, H., with Marneffe & Nguyen-Ba-
 Tung, 355 (Mal.)
 Gasc, G. 414 (417) (Tryp.)
 Gatto L., 347 (Leish.)
 Gaud, M. & Poconie, A., 565 (Fev.)
 Gautrelet, J. 483 (Vma.)
 Gavrilov W., Dubois, A. & Fester Mine,
 333 (Lep.)
 — & Fester A. Mine 333 (Lep.)
 — & Nija, J., 808 (Misc.)
 Gear H. S. 158 (B.R.)
 Gear J., with de Meillon, 128 739 (Mal.)
 260 283 (Fev.)
 Gebert, S. 498 (Mal.)
 Geena, J. with Van den Branden, 237 (Misc.)

- Gerstin, L. E. with Checkley & Sydenstricker
 442 (Pel.)
 — with Sydenstricker Schmidt & Weaver,
 437 (Pel.)
 — with — Templeton & Weaver 439
 (Pel.)
 Geiser E. 626 (Lep.)
 Geiser E. R. 742 (Mal.)
 Geivrey J. 717 bis 718 (Chl.)
 — Toumanoff C. & Trev H. T. 293, 664
 (Mal.)
 Genodre W. with Pinochet, Romero & Viana,
 824 (Pl.)
 George J. V. 230 (Lep.)
 Georgiadis D. 402 (Tryp.)
 Georgy I. F. 73 (Fev.)
 Germond, R. C. 333 635 (Lep.)
 Ghaboon, P. with Alport 733 (Am.)
 — with — & El Gharun 437 (Pel.)
 Ghidini G. M. 401 (Tryp.)
 Ghazetti L. 184 (Mal.)
 Ghosh, H. 14 (Am.)
 Giacobbie M. 456 (Mal.)
 Gijbols, G. 356 (Mal.)
 Gil de Castro Cerqueira, with Mendes, 336
 (Lep.)
 Gilroy H. M. & Denue C. C. 706 (R.H.F.)
 Gill, D. G. with South & McAlpine, 478 (Hcl.)
 Gillanders, G. 526 (Misc.)
 Gillanders, G. 5th (Mal.)
 Gil Yopez, C. 360 (Lep.)
 Genovesi, C. with Alberto Aguirre, 415 (Tryp.)
 Gensaid, V. & Floresca, P. 130 (Mal.)
 Gerson, G. 223 (Misc.)
 Giordano F. 663 (Mal.)
 Giordano J. J. with Marzetta & Doblañez, 714
 (Tryp.)
 Giordano, M. 154 (B.R.)
 Giovannoli, A. 180 151 479 485 (Hcl.)
 267 (Mal.)
 Guard, G. 422 829 (Pl.)
 — & Milham, M. 620 (Rab.)
 — & Radzoddy Ralazon, P. 830 (Pl.)
 Gerard, P. with Mattie Damon & Damon,
 Levevre Mue 349 (Loush.)
 Garga S. 120 (Am.)
 Geros, P. 25th (Fev.)
 — with Darnad 849 849 850 (Fev.)
 — with — & Sparrow 849 (Fev.)
 Gessen, R. 280 (Chl.)
 — with Loopyt, 207 (R.B.F.)
 Githens, T. S. & Wolff O. C. 467 (Misc.)
 Givota G. & d'Ignazio C. 37 (Fev.)
 Glass, S. with Rosenfield 611 (Misc.)
 Glaser E. 333 (Lep.)
 Glander E. 333 (Lep.)
 Goepfer F. with Floch & Tasque 645 (Lept.)
 Gohar V. 99 (Der.)
 Gokhale S. K. with Bokher & Chitra 427
 (Pl.)
 Gold Coast, 349 (A. F.)
 Goldfarb A. I. with Herman 508 (Mal.)
 Goldsmith, G. A. Ogaard A. T. & Gove,
 D. F. 804 (Pel.)
 Goldstein, F. with Maxwell 90 508 794
 (Mal.)
 de Golovine, S. 634 (Lep.)
 Gomes, L. de S. 778 (Loush.)
 Gonzalez Barrera, P. 362 (Mal.)
 Gonzalez Rincones, R. 231 (Misc.)
- Goodall, J. W. D. 804 (Pel.)
 Gordon, H. M. 7 (Tryp.)
 Gordon R. M. 391 (Hcl.)
 — with Bertam, 497 (Mal.)
 — & Lumsden, W. H. R., 853 (Hcl.)
 Gore, Th. (Sp.)
 Gortner V., 868 (Dys.)
 Gortner V., 868 (Dys.)
 Gotten, H. B. & MacGowan, J. J. 836 (Hcl.)
 Gouget, R., 660 (Mal.)
 Gove, D. F., with Goldsmith & Ogaard, 806
 (Pel.)
 de Graaf, W. with Wolff, 282, 264 (Fev.)
 Gradie, H., 447 (Oph.)
 Gramet, E. & Schabma, A., 513 (Misc.)
 Gracia, A., Ionescu, N. G. Claudian, I. &
 Constantinoescu, P., 441 (Pel.)
 Greenbaum, R. S. with Leach, 314 (Bb.)
 Green, R. A. & Bransack, E. L., 194 (Rab.)
 Greenfield, J. G. & Holmes, J. M. 430 (Pel.)
 Greg, E. D. W. 658 (Hcl.) 732 (733) bis
 (Am.)
 — & Neill, A. 361 456 (Mal.)
 — with — 601 (Mal.)
 Greenberley J. with Catanel, 97 (Der.)
 Grenobles, with Lartigue, Mergon &
 Laurens, 366 (Mal.)
 Greval, S. D. S. with Lowe, 43 (Lep.)
 Grimes, C. & Lavigne, J. 664 (Mal.)
 Grimes, M., 46 (Lep.)
 Grobler J. M. with Finbyson, 581 bis (Fev.)
 Grott, J. W. 576, 579 (Dys.)
 Grunne, P. & Pilgermeier E. 808 (Dys.)
 Grunne, R. V. 314 (Bb.)
 Gungor G. 351 (Loush.)
 Guly P. with Marill & Keesa, 291 (Mal.)
 Gussner, F., with Bernard, Alcy & Many
 1509 (Hcl.)
 Gutschera, S. T. 493 (Mal.)
- H.
- Hackett, L. W. with Bates, 850 (Mal.)
 Haddad, E. 841 (Hcl.)
 Haas, A. J. C. with Karman, 206 (Lept.)
 Haflenschel, J. with Florman, 845 (Fev.)
 Halaksson, R. G. 728 (Am.)
 Halaksson, A. & Soble M. F. 864 (Mal.)
 Halakson, A. C. with Smith & Ahmed, 769
 (Loush.)
 Hallay L. T. 447 (Oph.)
 von Haller E. with Denecke, 140 (Tryp.)
 Hamburger H. J. 223, 812 (Misc.)
 Hampton, R. C. 822 (Pl.)
 Harin, A. M. 730 (Am.)
 Harbington, with Covell, 740 (Mal.)
 Harding, R. D. 697 (Tryp.)
 Hara, K. P. 529 (Misc.) 596 (Hcl.)
 — & Datta, S. C. 69 (Hcl.)
 Harwant Singh, with Afridi & Jawant Singh,
 800 (Mal.)
 Haselmann, C. M., 4 (A. & S.)
 Haselmann-Kahert, M., 878 (Misc.)
 Haulway M. & Serh to, 383 (Misc.)
 Haxner G. 806 (Mal.)
 Hawan, Territory of, 830 (Pl.)
 Hawking, F. 308 (308) (Hcl.) 697 700 701
 (Tryp.)

- Hayter R. T. M. with Chopra, Das Gupta & Sen, 186 (Mal.)
 — with — Roy & Sen 746 (Mal.)
 — with — & Sen 503 746 (Mal.)
 Hoadlee T. J., with Powers 94 (Y.F.)
 Health, Canberra, (559) (Y.F.)
 Hees, E. 238 (Misc.)
 Hegner R. & Dobler M. 508 (Mal.)
 Henard, C. with van Hoof & Peel, 703 *qual.* (Tryp.)
 Henry Lester Institute of Medical Research Shanghai, 757 (B.R.)
 Herman, C. M. & Goldfarb A. I., 508 (Mal.)
 Herms W. B. 79 (B.R.)
 Hernan Mendez 856 (Mal.)
 Herr A. & Brumpt, L. 146 (Tryp.)
 Hertig, M. 833 (Fev.)
 Hervel, J. E. with Webb 739 (Mal.)
 Heydon, G. A. M. & Bearup A. J. 220 (Hel.)
 Higgins, A. R., 282 (Chi.)
 Hilgermann R. 569 (Fev.)
 Hull, R. B. with Cambournac, 784 (Mal.)
 Hulmy F., with Wakol, 273 (Fev.)
 Himwich, H. E. with Lewy Frosing & Spies (444) (Pel.)
 Hinman, E. H., (280) (Mal.)
 — & Hurlbut H. S. 788 *bis* (Mal.)
 Hoang Tich Try with Toumanoff 187 (Mal.)
 Hoare C. A., 710 (Tryp.)
 Hodgkin, E. P., 302 (Hel.)
 Hoff H. & Shaby J. A. 147 582 (Hel.)
 Hoffman W. A. & Janer J. L. 67 (Hel.)
 Hoffmann, W. H. (93) 536 (Y.F.) 414 (Tryp.)
 Holland E., with de Meillon, 480 (Hel.)
 Holland G. P. 843 (Fev.)
 Holmes, J. M., 35 (Sp.)
 — with Greenfield 430 (Pel.)
 Holmes, W. E., 138 866 (Mal.)
 Hong Kong, 818 (Misc.)
 van Hoof, F. Henard, C. & Peel E. 703 *qual.* (Tryp.)
 van Hoof, L., 397 (Tryp.) 419 (PL.)
 van Hoof, T., with Rodheim, 795 (Mal.)
 Hope, R. B., with Ruddock, 534 (Misc.)
 Hopkins, R. 628 (Lep.)
 Horgan, E. S. & Kirk, R., 774 (Leish.)
 Hötting F. O., 84 85 (Y.F.)
 Horner I. 138 (Tryp.)
 Horrenberger R. with Béguet, 621 (Rab.)
 Hou, H. C. 441 (Pel.) 635 (Lep.)
 Howard S. C. 866 (Mal.)
 Hoyt, A. & Warner D. 815 (Rab.)
 Hui H. F., 152, 489 (Hel.)
 — & Chow C. Y. 151 (Hel.)
 Hu S. M. K. 181 (Mal.)
 Huang, C. H., 773 (Leish.)
 Huard, P. 119 733 (Am.)
 — & Bertrand C. 225 (Misc.)
 Hudson, H. W. Jr., with Botaford & Chamberlain, 848 (Hel.)
 Hughes W., 224 (Misc.)
 Hull, J. B. Dove W. E. & Platta, N. G. 233 (Misc.)
 — & Shields, S. E. 380 (Misc.)
 Humphries S. V. 523 (Misc.)
 Hurlbut, H. S., with Hinman, 788 *bis* (Mal.)
 Hurton, E. L. & Shute, P. G. 458 (Mal.)
 — with Sinton & Shute, 84 53 183 (Mal.)
 Huzli, T., with Sakanaka, 372 (Dys.)
 Hwang, M. S. with Morris & Kuo 799 (Pel.)
- I
- Ide M. 723 (Chi.)
 d'Ignazio, C., with Giunta, 257 (Fev.)
 — Lombardi, A. & d'Arcangelo D., 565 (Fev.)
 Ignacio J. L., 335 (Lep.)
 Ignacio Chala, J., (334) (Lep.)
 Imbasciati, B., 95 (Y.F.)
 Impellomeni, R., with de Muro 375 (Dys.)
 Inbooa, J. M., with Justin-Besançon & Caroli 32, 33 (Sp.)
 Indian Medical Gazette, 232 (Misc.) 748 (Diet.) 769 (Leish.)
 International Journal of Leprosy 343 (Lep.)
 Ionescu N. G. Clandian, I. & Constantinescu, P., 446 (Pel.)
 — with Grecu, Claudiu & Constantinescu 441 (Pel.)
 Ionescu-Mihaiu, C. Cince, M., Baltoanu, I. & Combesco D. 255 (Fev.)
 Iriarte D. R. with Briceño Rosal, 105 *bis* (Tryp.)
 Iriawa, T., (232) (Misc.)
 Irvine C., 342 (Lep.)
 Irving H., with Reid & Scherer 817 (Misc.)
 Iswanah, V. & Nair V. G. 28 (Y & S.)
 Iturraspe M. C., 588 (Hel.)
 Ivanisevich, O., 587 (Hel.)
 Iyengar M. O. T. 652 (Hel.)
 Izquierdo F., 231 (Misc.)
- J
- Jack, R. W., 400 (Tryp.)
 — 690 (Tryp.)
 Jacob, V. P., with Russell, 506 *ter* (Mal.)
 — with — 53 (Mal.)
 Jacobi, L. 59 (Mal.)
 Jaffard H. with Burnet, 331 (Lep.)
 Jadin, J., 618 (Rab.) 734 (Am.)
 — & Arnaldi, E., 557 (Y.F.)
 — & Delperdango, G., 480 (Hel.)
 Jakmauh P. J. with Welch, 575 (Fev.)
 Jakusheva, A. I., 451 (Mal.)
 James, C. S., 185 (Mal.)
 James, S. P., 59 174 (Mal.) 88 (Y.S.)
 Janer J. L., 729 (Am.)
 — with Hoffman, 67 (Hel.)
 Jaramillo R. 272 (Fev.)
 Jaswant Singh, with Afridi & Harwant Singh, 500 (Mal.)
 Janlines, C. with Sohler 114 (Am.)
 Jcrace, F. 285 (Mal.)
 Jannon Infante J. 258 (Fev.)
 Jobbins, D. M., with Clark & Komp 688 (Mal.)
 Joekas, M. 600 (Mal.)
 Johansen, F. A. 345 (Lep.)
 Johnson, C. G., 886 (Misc.)
 Johnson, C. M., with Saperio, 111 (Am.)
 Johnson, H. N., with Leach, 616 (Rab.)
 Johnson, W. B., 329 (Lep.)

L

- Labernadie, V., 341) 634 (Lep)
 Laborde, A., 378 (Dya.)
 La Face, L., 283 (Mal.)
 Lagrosa, M., 335 (Lep.)
 Lahiri M. N., Das P. C. & Malik, K. S. 718 (Chl.)
 — with Pasricha, Das & Paul, 276 (Chl.)
 Laidlaw P., 627 (Lep)
 Laigret J., 850 (Fev)
 — & Durand R., 266 267 569 (Fev)
 Lal, R. B., 717 (Chl.)
 Lal, S. with Chopra & Pasricha, 588 (Hel.)
 — with Pasricha & Banerjee 749 (Diet)
 — with — Malik & Biswas 750 (Diet)
 Lal, R. & Townsend, R. S., 384 (Misc.)
 Lambert, S. M., 70 (Misc.)
 Lamborn, W. A., 824 (Pl.)
 Lamborn, W. A. S., 370 (Bl.)
 Lambrechts, A., with Brull & Barac, 34 (Sp)
 Lamote 128 (Mal.)
 Lancet, 578 (Fev)
 Landsberg, J. W. with Otto 593 (Hel.)
 Lane, C., 477 (Hel.)
 Langauer L., 624 (Lep)
 Lara, C. B., 335 632 (Lep.)
 Larghoro-Ybars, P., 590 (Hel.)
 Lartigue J., Grenolleau, J., Meguin J. & Laurens, L. (368) (Mal.)
 Lawman P. 811 (Misc.)
 — with Rodhain, 459 509 794 (Mal.)
 Lataste, C. with Farinaud, Baccialone & Canet, 188 (Mal.)
 — with Querido & Lwoff 434 (Pel.)
 Lattouf A. G. 733 (Am.)
 Laurens, L., with Lartigue, Grenolleau & Meguin, (368) (Mal.)
 Lavarello A. O., (803) (Pel.)
 Lavergne, J., with Grimes, 864 (Mal.)
 Lavery F. J. 447 (Oph.)
 Lavier G., 146 (Hel.) 869 (Dya.)
 — Berdely M., Carroll, J. & Boulanger P., (153) (Hel.)
 — with Brumpt 151 (Hel.)
 — & Leroux, R. 401 (Tryp)
 Lawkovich W. 271 (Fev)
 Lawler H. J. (650) (Hel.)
 Lawson T. C. 212 (Hel.)
 Leach C. N., with Denison, 621 (Rab.)
 — & Johnson, H. N., 616 (Rab.)
 League of Nations Health Organisation, 757 (B.R.)
 Leathers, W. S. with Meleney & Frye, 115 (Am.)
 Le Coquino de Bussy I. J. & van Loghem J. J., 268 (Fev)
 Lee, C. U., with Yuan & Chu 346 (Leish.)
 Lee, D. H. K. & Courtice, R., 879 (Misc.)
 Leeson, H. S., 453 (668) (Mal.)
 — with de Meillon, (665) (Mal.)
 Le Fleming, H. with Field, 58 739 (Mal.)
 Le Gac, P., 575 (Fev)
 — Samara, M. & Servant, J. 275 (Fev)
 — & Servant, J. 18 (Tryp.) 273 (Fev)
 Le Geonach J. 500 (Mal.)
 Lehmann, J. & Nielsen, H. E. 313 (Bb.)
 Leite, A. L. 418 (Tryp)
 Lent, H., 713 (Tryp)
 — & Pifano F., 142 (Tryp)
 Lenti, P. & Serra, G. 23 (Y & S)
 Leonida, J. (807) (Pel.)
 Lépine, P., 620 (Rab.)
 — Mathis M. & Sautter V. 311e 614 (Rab.)
 Leprosy Review (45) 328 (Lep)
 Lepel L., 494 (Mal.)
 Le Renard, A. & Raynaud M., 258 (Fev)
 Leriche, E., 790 (Mal.)
 Leroux, R. with Lavier 401 (Tryp)
 Lesné Cayla & Lichtenberger 362 (Mal.)
 Lester, H. M. O., 7 (Tryp.)
 Lè-Thi Van, with Seyberlich, 614 (Misc.)
 Le Van J. H., 555 (Y.F.)
 Le-Van-Phung, with Montel, Do-Van-Hoanh & Tran Van-Hanh 43 (Lep)
 Levine N. D. 373 (Dya.)
 Levitanskia, P. B. 373 (Dya.)
 Levy A. H. 449 (Oph.)
 Lewillon, R., Devignat, R. & Schoetter M., 828 (Pl.)
 Lewis, D. J. 454 (Mal.)
 — with Kirk, 770 (Leish.)
 Lewis, J. T., 213 (Hel.)
 Lowthwaite R., 620 (Rab.) 642 (R.B.F.) 847 (Fev)
 — & Saviour S. R. 578 847 (Fev)
 Lowy F. H., Himwich H. E., Frostig J. P. & Spies, T. D. (444) (Pel.)
 — Spies, T. D. & Aring, C. D. 805 (Pel.)
 Lichtenberger with Lesné & Cayla, 362 (Mal.)
 Lichterman A. & Kleeman, I. 660 (Hel.)
 Lieb F., 719 (Chl.)
 Lie Kian Joe, with Bonna, 220 (Hel.)
 Liou Y. C., 614 615 (Rab.)
 — with Raynal, 614 621 (Rab.)
 — with — & Felsolle, 720 (Chl.)
 Lieu V. T. with Shih & Wu, 122 (Am.)
 Lillie, R. D., Dyer R. E. & Topping, N. H. 572 (Fev)
 — with Roe & Wilcox, 378 (Misc.)
 Lima, J. P. C. & Arantes, M., 332 (Lep.)
 Lima, L. de S. (36) (Lep.)
 Lincocombe D. R., with Fanst, Sawitz, Tobla, Odum & Peres, 62 (Hel.)
 — with Sawitz & Odum, 62 (Hel.)
 Lindberg, K., 659 bis (Hel.)
 Lion, M. 387 (Mal.)
 Lipcomb F. M. (292) (Mal.)
 Liu, C. Y., (425) (Pl.)
 Liu P. Y. with Zia & Pang, 579 (Fev)
 Liu, W. T. & Chung H. L., 261 bis (Fev)
 — with — Wang & Chu 789 (Mal.)
 Livadas, G. Canollakis, A. & Valsoras, V. G. 291 (Mal.)
 Livresco M. 442 (Pel.)
 Lleras Restrepo, E., 344 (Lep.)
 Lloyd L. 378 (Misc.)
 Lodenkamper H. 717 (Chl.)
 Loeb, L. M. & Greenbaum, R. S., 314 (Bb.)
 Loewenthal, L. J. A., 100 101 102, 103 104 (Der.)
 van Loghem J. J., with Le Coquino de Bussy 268 (Fev)

- Lombarth, A with d'Ignazio & d'Arzaspelo 363 (Fev.)
 Longley B J Charven N M & Tatum, A L 12 (Tryp.)
 van Lookeren Campagne J 219 (Hel.)
 Loopuyt, L & Gaspen R 707 (R B F.)
 Lopez-Gutierrez, J C with Prat 590 (Hel.)
 Lorando, N & Caramanica P 674 (Fev.)
 Lorenzo, R & Boto D 13 (Hel.)
 Losner S with Dub. 411 (Tryp.)
 da Lotto, E 552 (F.)
 Loure E M & York, W 404 405 (Tryp.)
 Lowe J 39 51 340 (Lep.)
 — & Chatter, S N 47 (Lep.)
 — & Grimal S D N 43 (Lep.)
 Lucena, D 60 (Mal.)
 Lundén, F H R with Gordon, 653 (Hel.)
 Lund E E & Dennis E W 331 (Misc.)
 Lupo M with Danekopols, Crecun & Petresco 567 (Fev.)
 Lush, D 646 (Fev.)
 Lutz A 627 (Lep.)
 Lwoff, A with Balhl, Querido & Orsted, 435 (Fel.)
 — Querido A, Dognonnet, L & Gerwer 435 (Fel.)
 — with — & Latarte, 434 (Fel.)
 Lwoff, M & Cecaldi, J 13 (Tryp.)
- M.
- Ma, W S with Chung, Khoo & Chang, 119 (Am.)
 Maas, E with Ruge, 43 (Lep.)
 MacAlpine, J G with Smith & Gull, 478 (Hel.)
 MacCallum, A F 872 (Oph.)
 MacCallum, F O with Findlay 93 (F.)
 — with Margatroyd & Findlay 129 (Mal.)
 McCannan, W O 231 (Misc.)
 Macchiarola, A 234 234 255 (Fev.) 234, 573 (Fev.) 424 425 (F.)
 McClements, S 590 (Hel.)
 MacCreary D 280 (Mal.)
 McDaniels H E with Rosenfeld, 616 (Rab.)
 McDonald F G with Ellis & Spence 445 (Fel.)
 MacDonald, G 379 626 (Misc.)
 MacDonald I 118 (Am.)
 Macfie, J W S 837 (Misc.)
 MacGowan, J J with Gorten, 836 (R.)
 Macheboeuf, M & Mandou R 648 (Hel.)
 Mackay J M 649 (F.)
 McKay W J 5 661 (Misc.)
 M. Kendrick, A G 616 (Rab.)
 McKenna A 219 (Hel.) 530 809 (Misc.)
 McKibbin J M with Wassman, Michelson & Ershjenn, 797 (Fel.)
 McLendon, S B with Young 362 (Mal.)
 Macleod, J M H & Moende I 653 (B R.)
 McMahon, J C with Wiseman, Symes & Treddale, 786 (Mal.)
 McMullen, W H 449 (Oph.)
 McNaught, J B Broad, R. R. & DeEda, F 308 (Hel.)
 Macvicar N 253 (Fev.)
 Madras, 273 274 (Fev.) 277 (Chl.)
 de Marshall O 362 (Fev.)
 — & Moera, J A, 574 (Fev.)
 Magath, T B & Mcleary H E, 729 (Am.)
- Maggi, A with Carter & Orocco, 589 (Hel.)
 Major E 461 (Am.)
 Majumdar P., 423 434 (Fel.) 483 (Hel.)
 — & Krasne, M., 487 (Hel.)
 Maister, M & Miller A 280 (Fev.)
 Makara, G with Bodrogi, 114 (Am.)
 Malbrant, R., 563 (Fev.) 763 (Lash.)
 Maldonado Romero, D 280 (Lep.)
 Malik, K. S., with Lahiri & Das, 718 (Chl.)
 — with Pasricha, Lal & Bhowra, 750 (Dart.)
 Manalang, C 48 (Lep.)
 Manalang, J 331 630 (Lep.)
 Manca, S 503 (Mal.)
 Mandekos, A G 163 (Mal.)
 Mandoul, R., 374 (Dys.)
 — with Maccheboeuf, 648 (Hel.)
 Mansfeld, J A 174 (Mal.)
 Manofresco, C., with N. Trusiano & Popovici, 63 (Hel.)
 Manoochian, Y., 642 (R B F.)
 Manson-Bahr P., 174 (Mal.) 435 (B R.)
 — & Ransford, O N., 99 (Der.)
 Marwell, R. D 80 (Mal.)
 — & Goldstein, F., 80, 809, 794 (Mal.)
 — & Votter, M A., 509 (Mal.)
 Many, with Bernard, Alay & Gussow, 130 (Hel.)
 Mapstone, P A & Dry N C 87 98 (Der.)
 — & Makery, A K 213 661 (Hel.)
 — & Sendar Rao, S 307 (Hel.)
 Marberg, K with Renter & Birch, 259 (Fev.)
 Marchoux, E 331 (Lep.)
 — & Chorn, V 49 (Lep.)
 Marnchal P with Sparrow 266, 850 (Fev.)
 Mariani, G 255 578 (Fev.)
 Marill, F Alay L & Manno J., 483 (Hel.)
 — with — & — 487 (Hel.)
 — with — & Castriky, 150 483 (Hel.)
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 — & Knipe F. W. 504 (Mal.)
 — & Mohan, B. N. 359 bis 741 (Mal.)
 — Sweet W. C. & Menon, M. K. 782 (Mal.)
 Russo E. 422 (Fl.)
 Rutherford, R. N. 464 (Vms.)
 Ryrie, G. A. 337 636 (Lep)
- 8.
- Sáenz B. & Palomino J. C. 29 (Lep)
 Sáenz Vera, C. 423 824 (Pl)
 Saglam T. (601) (Mal)
 Saldaput Health Project 625 bis (Lep.)
 Saint Etienne, with Rivualen, Marlangeas &
 Marty 584 (Fev)
 Sakanaka, T. 371 (Dys)
 — & Hurli, T. 372 (Dys)
 Salakan, 443 (Pel)
 Saloon, G. 186 (Rab) 253 263 (Fev) 403
 (Tryp.) 550 (Y.F.)
 Salm, H., 442 (Pel)
 Salvemagho F. J. with Costa, 516 (Vms.)
 Salvason, O. 436 (Pel.)
 Samara, M. with Le Gao & Servant 275 (Fev)
 Sanders, J. P. & Dawson, W. T. 185 (Mal.)
 Sandground, J. H. 153 219 (Hel)
 — with Boone, 457 491 (Hel)
 — & Frawinhardjo S. 153 (Hel.)
 Sandicchi, G. with Marotta, 180 (Mal.)
 Sanjolan, A. (341) (Lep.)
 São Paulo F. 131 (Mal)
 Sapero J. J. 729 (Am.)
 — & Johnson C. M., 111 (Am.)
 Sardjito, 332 (Lep.)
 — with Assien Tahar Eerkens & Djochana,
 768 (Leish.)
 — with Haulsway 363 (Misc.)
- Sarkar S. L., 748 (Diet.)
 — & Bhattacharyya, B. M. 47 (Lep)
 Sasportas L. 667 (Mal.)
 Sati, M. H. with Kirk, 771 (Leish)
 Sato, S. with Ota, 628 (Lep)
 Satta E., 136 (Mal.)
 Saunders G. 397 (Tryp.)
 Santet, J., 199 (R.F.)
 — with Joyeux, 348 (Leish.)
 — with — & Sicé 286 (Mal.)
 — with Sicé & Ethes 857 (Mal.)
 Sautter V. Mlle. with Lépine & Mathis
 614 (Rab)
 Savagnone L., 191 (Rab)
 Savino E. & Anchezar B. 428 (Pl)
 — Morales Villason N. & Anchezar B.
 422 (Pl.)
 Savoor S. R., with Lowthwaite 576 847
 (Fev)
 Sawitz W. 306 (Hel.)
 — with Panat, Tobie Odum, Peres &
 Lincome, 82 (Hel.)
 — Odum V. L. & Lincome D. R. 62
 (Hel.)
 Sawyer W. A., (558) (1 F)
 Saxena, G. S., 350 (Leish)
 Scaffidi, V. Jr 118 (Am.) 198 (R.F.)
 205 (R.B.F.)
 Schaafsma, A., with Graesset 513 (Vms.)
 Scharf J. W. (188) (Mal)
 Scherer J. H., with Reid & Irving 817
 (Misc.)
 Schiavi, C. 150 (Hel)
 Schilling C. 398 bis 397 790 (Mal.) 709
 (Tryp.)
 Schircher E. M. 528 (Misc)
 Schlenk, F., with v. Euler (436) (Pel)
 Schmidt, H. L. Jr with Sydenstricker
 Geall & Weaver 437 (Pel.)
 Schneider J., with Decourt & Belfort, 135
 (Mal.)
 — with — & Herrest-Groediker 458
 (Mal.)
 — with Molaret 457 (Mal.)
 Schoenleber A. W., 727 (Am.)
 Schoetter M., with Lewillon & Devignat
 828 (Pl.)
 Schretzmannayr A. 673 877 (Misc) 753 (Bb.)
 Schuffman, S., 39 337 (Lep)
 Schuermann, W., (232) (Misc)
 Schwarz, J. & Straub M. 649 (Hel.)
 Schweiger L. B. with Behrens Barker &
 Reeves, 195 (Rab)
 Scott, C. J. 21 (Y. & S.)
 Scott, H. H. 807 (Misc.)
 Scott, J. A., 484 647 (Hel)
 Scott, G. 131 (Mal.)
 Seal, S. C., 278 (Chl)
 Seibell, W. H. & Butler R. E. 438 (Pol.)
 Sen, M. 311 (Bb.)
 Selwyn-Clarke, 818 (Misc.)
 Sen, B., with Chopra, Das Gupta & Ahmed,
 377 (Dys.)
 — with — & Hayter 186 (Mal.)
 Sen B. with Chopra Roy & Hayter 746
 (Mal)
 — with — & Hayter 503 746 (Mal.)
 Sen, P. 365 (Mal.)
 Sen, S. with Chopra & Basu 205 (R.B.F.)

R.

- Rachmawati, M. with Adler 778 (Lesh)
 Radeady Ralaroy P. with Guard, 830 (Pl)
 Radio P. & Rostowski L. 448 (Oph)
 Radina, R., 38 bus 45 47 336 337 342 (Lep)
 — with Dubois, (43) (Lep)
 Rafael Ribeiro J. (149) (Hel)
 Raffaele G. 285 (Mal)
 Ragot, C. with Alam 123 (Am)
 Raj, M. P. with Cochran & Roy 242 (Lep)
 Rajan, R. V. 25 (A & S)
 — & Rangiah, P. N. 731 (Am)
 Ram, T. 833 (Misc)
 Raman, T. K. 803 (Pel)
 Ramon, C. 351 (Lesh)
 Ramirez Enriquez F. 816 (Am)
 Rangiah, P. V. with Rajan, 731 (Am)
 Ramsford O. V. with Manson-Bahr 99 (Der)
 Rao, M. S. 825 826 (Pl)
 Rao, R. S. with Pandit & Shortt, 274 (Fev)
 — with Shortt, Pandit & Anderson, 833 (Fev)
 Rao, S. R. 418 (Pl)
 Rao, S. B. with Basu, 301 (Hel)
 — with Chopra, 650 (Hel)
 Rappoport, I. with Nasse, 728 (Am)
 Rashim, M. G. & Khovanakaya, A. I. 133 (Mal)
 Raskine, A. J. 748 (Mal)
 Ravold, A. with Condry & Pecker 50 (Lep)
 Raymond, (847) (Fev)
 Raymond, W. D. 72 bus, 679 (Misc)
 Raynal, J. 500 (Fev)
 — & Tourner, J. 236 (Fev)
 — & Vethot, E. 256 (Fev)
 — & Lacom, Y. C. 614 621 (Rab)
 — & Fessende L. 720 (Cbl)
 Raymond, M. with Le Renard 248 (Fev)
 Rebegatti R. (506) (Fev)
 Reddy D. G. & Subramaniam R. 319 (Lesh)
 Redmond W. B. 58 (Mal)
 Reensterna, J. 629 (Lep)
 Reeves, J. L. with Dehrens Schweiger & Barker 195 (Rab)
 Reichenow E. 14 (Tryp)
 Reid, J. D. Scherer J. H. & Irving H. 817 (Misc)
 Reis H. 67* (Oph)
 Renter R. Blach S. & Marberg H. 259 (Fev)
 Remlinger I. & Baffly J. 818 bus 616 (Rab)
 Renault L. with Vennam 214 (Hel)
 Repond, A. 675 (Misc)
 Rescher R. with Dubois 240 (Lep)
 Revue Internationale de Trachome 447 (Oph)
 Reyer W. 235 817 (Misc)
 Reyes, V. with Delbon 573 (Fev)
 — & Richard J. 578 (Fev)
 Reynolds P. H. K. with Stone 300 (Mal)
 532 (Misc)
 Rhodes, A. J. 448 (Oph)
 Rial, B., with Tabco Costa & Osmami, 839 (B.R.)
 Richard, J. with Reyes 578 (Fev)
 Richards, P. W. Tansley A. G. & Watt, A. S., 609 (Tryp)
- Richet, C. & Antoine, G. 412 (Try)
 Richet, P. 308 (Hel)
 Ricklin, J. 231 (Misc)
 van Riel, J. & Mol, G. 419 (Pl)
 Riley W. A. 537 (Hel)
 Riou, M. 813 (Misc)
 — with TomDec, 31 (Sp)
 — with Vogel, 8 (Tryp) 87 (Pl)
 81 (Y F) 123 (Mal) 168 (Rab)
 Rishu, D. P. 309 (Lep)
 Risques, J. R. 104 (Der)
 Ristorcelli, A. 347 (Lesh)
 Rita, G. 191 (Rab)
 de Ritus, F. 794 (Mal)
 Ritsert, K. 435 (Pel)
 Rivoalen, Brunen & Jernover, 578 (Fev)
 — Marlingreen, Marty & Saint E. 534 (Fev)
 Rivoalen, A. (306) (Hel)
 Rivoalen, P. with Boesdiment, 340 (Lesh)
 Rizzo J. 732 (Am)
 Rizzotti, G. 644 (Lep)
 Ro, M., (490) (Hel)
 — with Yokogawa, S. Kobayashi, Yum Otsuka & Yokogawa, M. 631 (Hel)
 Roberts, F. H. S. 587 (Hel) 844 (Fev)
 Roberts, J. I. 200 (Fev) (575) (Misc)
 — with Anderson, 804 (Misc)
 Robertson, D. S. (441) (Pel)
 Robertson, R. C. 792 (Mal) 810 (Misc)
 Roban, C. & Broches L., 402 (Tryp)
 — with Sed & Oswald, 18 (Tryp)
 Robinson W. D. with " " 440 (Pel)
 Rocca F. 314 (Bb) 405 (Mal)
 Rockefeller Foundation, 75 (B.R.)
 Rodalac B. with Sed, 551 (Y F)
 Rodbars J. 367 600 670 (Mal)
 — & van Hood T. 795 (Mal)
 — & Lammann, P. 450 809 794 (Mal)
 — & Mylde G. 61 (Mal)
 Rodriguez, J. K. 627 (Lep)
 — & Wade, H. W. 238 (Lep)
 — with — 338 (Lep)
 — & Flanilla, F. L. 630 (Lep)
 — with — & Tolentino, 631 (Lep)
 Rodriguez Molina, R. 529 (Misc)
 Roe M. A. Lillie, R. D. & Walcott, A. 878 (Misc)
 Rortia, C. (234) (Misc)
 Rogers, L. 31 (Sp) 350 (Lesh)
 — & Merr E. 605 (B.R.)
 Rogers W. P. (592) (Hel)
 Rothermender W. 447 (Oph)
 Roman, E. 298 (Hel)
 Romania, C. 143 416 (Tryp)
 — with Colas-Belcoeur (347) (Lesh)
 Romania, J. with Rowband 413 (Tryp)
 Rosen, L. B. with Pinotti, Gonotte & Viana, 824 (Pl)
 Ros, A. with Carr & Melendez, 684 (Mal)
 Rosedale J. L., 732 (Bb)
 — with Cantom & Morria, 887 (B.R.)
 Rosenblum, L. A. with Jolliffe & Fair (Pel)
 Rosenfeld, I. & McDannah, H. E., (Rab)
 Rosenfeld, S. & Glass, S. 511 (Am)
 Rosenthal, E. 185 (Mal)
 Rower H. J. 425 (Pl)

Ross H., 38 (632) (Lep.)
 — with Black, 42 (Lep.)
 Rostkowski L., with Radlo 448 (Oph.)
 Rotberg A., 43 (Lep.)
 Roth H., 660 (Hel.)
 Roton 285 (Fev.)
 Roubaud, E. & Descareaux, J. 217 (Hel.)
 — & Provost, A. 139 399 (Tryp.)
 — & Romafia, J. 413 (Tryp.)
 Roussel H. with Burnet Cuénod & Natal
 873 (Oph.)
 Row (48) (Lep.)
 Roy A. C., with Chopra & Marumdar 750
 (Diet.)
 Roy D. N. 500 (Mal.)
 — with Chopra, Hayter & Sen, 748 (Mal.)
 — with Strickland & Sen Gupta, 859 (Mal.)
 Roy E. with Cochrane & Ray 342 (Lep.)
 Roy S. C., 291 (Mal.)
 Rubegni R. (591) (Hel.)
 Ruddock, J. C. & Hope, R. B. 534 (Misc.)
 Ruge & Maass, E. (43) (Lep.)
 Ruge H., 259 (Fev.)
 di Ruggiero, with Jolly 206 (Fev.)
 Ruiz, H., with Kumm, 357 (Mal.)
 Rule, A. M., with Kolmer & Kaat 708
 (Tryp.)
 Russell A. J. H., 91 (Y.F.)
 Russell, P. F. & Jacob V. P. 53 (Mal.)
 506 *ter* (Mal.)
 — & Kupe, F. W. 504 (Mal.)
 — & Mohan B. N. 359 *bis* 741 (Mal.)
 —, Sweet, W. C. & Menon M. K. 782 (Mal.)
 Russo E., 422 (Pl.)
 Rutherford R. N. 464 (Vms.)
 Ryne G. A. 337 638 (Lep.)

S

Sáenz, B. & Palomino J. C. 39 (Lep.)
 Sáenz Vera, C. 423 824 (Pl.)
 Saglam T. (801) (Mal.)
 Sandapet Health Project, 625 *bis* (Lep.)
 Saint Etienne with Rivoulet Mariungens &
 Marty 684 (Fev.)
 Sakakura, T. 371 (Dys.)
 — & Huxu T. 372 (Dys.)
 Salekan, 443 (Pel.)
 Saleun, G. 198 (Rab.) 253 263 (Fev.) 403
 (Tryp.) 550 (Y.F.)
 Salm, H. 442 (Pel.)
 Salveraglio F. J. with Costa, 516 (Vms.)
 Salvesson, O. 456 (Pel.)
 Samara, M., with Le Gac & Servant, 275 (Fev.)
 Sanders J. P. & Dawson W. T. 185 (Mal.)
 Sandground, J. H. 153 219 (Hel.)
 — with Boone 487 491 (Hel.)
 — & Prawirohardjo, S. 153 (Hel.)
 Sandicchi, G. with Marotta 180 (Mal.)
 Sanjuán, A. (341) (Lep.)
 São Paulo F. 131 (Mal.)
 Saperio J. J., 728 (Am.)
 — & Johnson, C. M., 111 (Am.)
 Sardjito 332 (Lep.)
 — with Amoen Tahir Eerikens & Djoehana,
 768 (Leish.)
 — with Haulussy 383 (Misc.)

Sarker S. L. 748 (Diet.)
 — & Bhattacharyya, B. M. 47 (Lep.)
 Sarportas L. 667 (Mal.)
 Sati M. H., with Klrk, 771 (Leish.)
 Sato, S. with Ota, 628 (Lep.)
 Satta, E. 138 (Mal.)
 Saunders G. 397 (Tryp.)
 Sautet J. 199 (R.F.)
 — with Joyeux, 346 (Leish.)
 — with — & Sicé 288 (Mal.)
 — with Sicé & Ethes, 857 (Mal.)
 Sautter V. Mlle. with Lépine & Mathus,
 614 (Rab.)
 Savagnone, L. 191 (Rab.)
 Savino E. & Anchezar B. 426 (Pl.)
 — Morales Villazon N. & Anchezar B.
 422 (Pl.)
 Savor S. R. with Lewthwaite 576 847
 (Fev.)
 Sawitz, W. 308 (Hel.)
 — with Faust, Tobac Odom Peres &
 Linscome 62 (Hel.)
 — Odom V. L. & Linscome D. R., 62
 (Hel.)
 Sawyer W. A. (558) (Y.F.)
 Saxena, G. S. 350 (Leish.)
 Scalfidi, V. Jr. 118 (Am.) 198 (R.F.)
 205 (R.B.F.)
 Schaafsma, A. with Grasset 513 (Vms.)
 Scharif, J. W. (188) (Mal.)
 Scherer J. H. with Reid & Irving 817
 (Misc.)
 Schiavi C. 180 (Hel.)
 Schilling, C., 368 *bis* 367 790 (Mal.) 709
 (Tryp.)
 Schliescher E. M. 528 (Misc.)
 Schlenk, F. with v Euler (436) (Pel.)
 Schmidt, H. L., Jr., with Sydenstricker
 Geesah & Weaver 437 (Pel.)
 Schneider J. with Decourt & Belfort, 135
 (Mal.)
 — with — & Kerrest-Groeduchier 458
 (Mal.)
 — with Mollaret, 457 (Mal.)
 Schoenleber A. W. 727 (Am.)
 Schottler M., with Lewiston & Devignat
 828 (Pl.)
 Schretzenmayer A., 673 877 (Misc.) 753 (Hb.)
 Schujman, S., 39 337 (Lep.)
 Schulemann, W. (232) (Misc.)
 Schwarz, J. & Straub M. 649 (Hel.)
 Schweiger L. B. with Behrens, Barker &
 Reeves 195 (Rab.)
 Scott C. J. 21 (Y. & S.)
 Scott, H. H. 807 (Misc.)
 Scott, J. A. 484 647 (Hel.)
 Scott, G. 131 (Mal.)
 Seal, S. C., 278 (Chl.)
 Sebrell, W. H. & Butler R. L., 438 (Pel.)
 Sein, M., 311 (Hb.)
 Selwyn-Clarke, 818 (Misc.)
 Sen B. with Chopra, Das Gupta & Ahmed,
 377 (Dys.)
 — with — — & Hayter 186 (Mal.)
 Sen, B. with Chopra Roy & Hayter 748
 (Mal.)
 — with — & Hayter 603 748 (Mal.)
 Sen, P. 385 (Mal.)
 Sen, S. with Chopra & Basu 205 (R.B.F.)

- Senakyn, H A 351 *bs*, 779 *bs* (Leish) 726
(Am)
— & Beattie, C P 587 (Hel)
— Bowrell, C & Beattie C P 479 (Hel)
Senevet, G (553) (Y F)
— & Aboumenc, E (65) Y F)
Sen Gupta, S C with Strickland &
Marmadar 177 (Mal)
— with — & Roy 859 (Mal)
Sergeant, E (176) (Mal) 519 (Yms)
Sergeant, Ed Sergeant Et Parrot, L &
Catana, A 179 (Mal)
Sergeant, Et 187 (Mal)
— with Sergeant Ed Parrot & Catana,
179 (Mal)
Serguov P G N bolkov V A Ziser, J A
& Kachalova E K 506 (Mal)
Serra G with Lema 23 (Y & S)
Servant J with Le Gac 18 273 (Tryp)
— with — & Samara, 273 (Fev)
Seyberlich & La-Thi-Van, 814 (Misc)
Shahy J A with Hoff, 147 692 (Hel)
Shaffer F J Shaul, J F & Mitchell, R H
553 (Misc)
Shah, S R A 232 (Misc)
Sharma, L R 840 (Fev)
Shastri T S 712 (Hel)
Shaul, J F with Shaffer & Mitchell, 533
(Misc)
Shcharenkova, A I & Dobmatova, A V 381
(Misc)
Shelley H M 675 (Misc)
Shewda, J 182 (Rab)
Shewda, S E with Hall, 290 (Misc)
Shiga, H 871 (Oph)
Shih, H E Wu, Y K & Liu, V T 122
(Am)
Shrimpton, E A G with Andrews, 237
(Misc)
Short, H E 273 274 (Fev) 277 (Chl)
— Pandit, C G Anderson, R M E &
Rao R S 853 (Fev)
— with — 273 (Fev)
— with — & Rao 274 (Fev)
Shu, S with Jordan & Padernan 192 (Rab)
Shulov A, 520 (Yms)
Shute D S (883) (Hel)
Shute P G, 296 666 (Mal)
— with Hutton 456 (Mal)
— with Benton, 204 (R F)
— with — & Hutton, 84 55, 183
(Mal)
Sicault, G & Memerika A 822 *bs* (Mal)
Sied, A 705 (Tryp) 878 (Misc)
— with Joyeux & Bawter 296 (Mal)
— Poudervigne H & Berthon, H
(Y & S)
— Roban C & Oberla, G 18 (Tryp)
— & Rodalac, B 551 (Y F)
— Sartet J & Ethes, 557 (Mal)
— & Torres, I 9 (Tryp)
Sugenbeck van Hrakelom, A 745 (Mal)
Sukora, H with Cam, 377 (Dys)
Salva, R with Castaneda, 259 (Fev)
Silva-Correa, V R 227 (Misc)
Simmons J S with Watson & Faust, (53)
(Mal)
Simons J with Jordano, 122 (Am)
Simpson T 21 (Y & S)
- Simpson, T W with Bang
(Mal)
Singh, G with Ahuja, 277 (Chl)
Singh, J & Singh, H, 190 (Mal)
Sinton, J A 58 57 *bs* 497 6
— H tion, E L & Shute
183 (Mal)
— & Shute P G 204 (R F)
Sivalingham, V., (292) (Mal)
Skryabin, K L, 662 (Hel)
Slazet Sudibyo, R M 25 (Y & S)
Smart, J 380 (Misc), (658) (Hel)
— with Edwards & Oldroyd, 46
— with White & Amberton, 46
Smertana H 68 (Hel)
Smithe, W S 219 (Hel)
Smith, C E 832 (Misc)
Smith, D J W 851 (Fev)
— with Burnett, Freeman & D
(Fev)
— with Derrick, 851 (Fev)
Smith, E C 77 (B R)
Smith, H H 851 (Y F)
Smith, J E with Jialanella 872 (C)
Smith, R O A., Halder K C & A
769 (Leish)
Smith, S (186) (Mal)
Smith, S G & Martin, D W 808 (F)
Smith, W H Y Gill, D G & McAlp
478 (Hel)
Sneath, P A T 90 (Y F)
Sobier M P with Halawani, 864 (Mal)
Sociedad Argentina Patologia Region
(B R)
Soerono 428 (Pl)
Solner R & Jaulmes, C 114 (Am)
Solkey S S 28 (Sp) (48) (Lep) 28
(Mal) 420 825 (Pl)
— Chitra, G D & Gokhale S K
(Pl)
— & Dakabrt, B B 828 (Pl)
Solares G 117 (Am) 281 (Chl)
Soldati, L with Porto, 734 (Eh)
Solomon, H C with Kopp 706 (Tryp)
Somogyi, J C 190 (Mal)
Somov A A with Prandel, 127 (Mal)
Soparker M B 277 (Chl)
Soral, (19) (Lep)
Sorel, F P J 86 (Y F)
Sorby A, 447 (Oph)
de Souza, M 458 (Mal)
Southwell, T with Blacklock, 820 (B R)
de Souza, A R 41 (Lep)
Spadaro, O 809 (Dys)
Spalding, J E with Fahlmerger 306 (Hel)
Sparrow H 267 (Fev)
— with Durand, 872, 849 (Fev)
— with — & Gurood, 849 (Fev)
— & Marschal, P 288, 850 (Fev)
Spiziale, V & Berger R (213) (Hel) 343
(Leish)
Spas, T D 447 (Pel)
— with Bils & McDonald, 445 (Pel)
— with Frostig, 443 (Pel)
— with Lewy & Aring, 803 (Pel)
— with — Humwach & Frostig, (444)
(Pel)
— with Viter 444 (Pel)
— & Ashe, W F 429 (Pel)

- Spining W D 872 (Oph.)
 Spreng A. 30 (Sp.)
 Sproule J C. 148 (Hel.)
 Stannus H S 430 (431) (Pel.)
 Starkoff O 83 (Hel.)
 Stefanopoulos G J with Kolochine-Erber 843 (Lept.)
 Stein, A. A., 33, 334 631 (Lep.)
 Steinfeld, F U., 698 (Tryp.)
 Stephenson, A G 386 (Misc.)
 Sternberg G 371 (Dya.)
 Stiles C. W., (218) (Hel.)
 Still, R. M. L. 816 (Misc.)
 Stone, W S & Reynolds, F H K. 360 (Mal.) 532 (Misc.)
 — & Thompson A. T 711 (Tryp.)
 Strangways-Dixon, D 867 (Mal.)
 Straub M. with Schwarz 649 (Hel.)
 Streof G M. with Zainal & Streof-Spaan, 592 (Hel.)
 Streof Spaan, A. M. with Zainal & Streof, 592 (Hel.)
 Strickland, C. 128 599 (Mal.)
 — & Baird, S Y., 129 (Mal.)
 — Roy D N & Sen Gupta, S. C., 859 (Mal.)
 — Sen Gupta, S C. & Marumdar P C 177 (Mal.)
 Strong, R. P. (364) (Fev.)
 Stuart Bunning G H 379 (Misc.)
 Stubbs, T H., with Young & Coatney 783 (Mal.)
 Suárez, R. M., 28 (Sp.)
 Suárez, P A. 423 (Fl.)
 Subramamam, R., with Reddy 349 (Leish.)
 Sulkin, S E & Nagle N., 193 (Rab.)
 — & Willett, J C 184 (Rab.)
 Sun C. J., 775 bis (Leish.)
 — & Chang, S 775 (Leish.)
 Sundar Rao, S., with Maplestone 307 (Hel.)
 Sutraco C. 388 (Misc.)
 Svensson, R., 736 (B.R.)
 Swales, W E., 69 (Hel.)
 Swaminathan, M. with Aykroyd 797 (Pel.)
 Swartzwelder J C., 62, (210) 660 (Hel.) 116 (Am.)
 Sweet, W C. with Russell & Menon 782 (Mal.)
 Syddiq M. M., 363 (Mal.)
 Sydenstricker V P with Cleckley & Geeslin, 442 (Pel.)
 — Geeslin, L. E., Templeton, C. M. & Weaver J W 439 (Pel.)
 — Schmidt, H L. Jr., Geeslin L. E. & Weaver J W., 437 (Pel.)
 Symes, C. B., with Wiseman, McMahon & Teeddale, 786 (Mal.)

T

- Taborsky J., 871 (Oph.)
 Taddia, L. & Viero, G 793 (Mal.)
 Takita J 281 (Chl.)
 Tallaferrero W H. (897) (Misc.)
 Tallice, R. V 144 (Tryp.)
 — Costa, R. S. & Osmani, J J., 145 (Tryp.)
 — Rial, B & Osmani, J., J 889 (B.R.)
 — & Fuente-Méndez, R. (145) (Tryp.)

- Tallice Miranda N & Costa R. S., (145) (Tryp.)
 — Mourigán, H Osmani, J J & Fernández-Lacort F 145 (Tryp.)
 — & Osmani, J J 141 (Tryp.)
 Tang C. C., 306 (Hel.)
 Tanguy Y., 38 (Lep.)
 Tanaley A. G. with Richards & Watt, 689 (Tryp.)
 Tappeler S. (39) (Lep.)
 Tarabini Castellani, G & Menggi L., 698 (Tryp.)
 Tasque, P. with Floch & Goerger 645 (Lept.)
 Tattenfeld, P. (235) (Misc.)
 Tatum, A. L. with Longley & Clausen 12 (Tryp.)
 Taylor H W Y 114 (Am.)
 Tchang, J & Mathews G B. 579 (Fev.)
 Tchernomoretz I with Adler 775 (Leish.)
 Teeddale C. with Wiseman Symes & McMahon 786 (Mal.)
 Tempel, D. with Flebiger (211) (Hel.)
 Templeton, C. M., with Sydenstricker Geeslin & Weaver 439 (Pel.)
 Tenhaeff C. & Ferwerda, S 591 (Hel.)
 Thambiah, S. (44) (Lep.)
 Thayer K. H. (841) (R.F.)
 van Thiel, P H. (454) (Mal.)
 Thodet, M. (218) (Hel.)
 Thomas, A. D., 621 (Rab.)
 Thomas, R. (293) (Mal.)
 Thompson, A. T. with Stone 711 (Tryp.)
 Thonnard Neumann, E. (801) (Mal.)
 Thygeson, P., 872 (Oph.)
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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

VOL 37]

1940

[SUPPLEMENT

MEDICAL AND SANITARY REPORTS
FROM
BRITISH COLONIES, PROTECTORATES
& DEPENDENCIES FOR THE YEAR 1938
[TENTH ANNUAL ISSUE.]

Summarized by P GRANVILLE EDGE,

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Issued under the Direction of the Honorary Managing Committee of the
BUREAU OF HYGIENE AND TROPICAL DISEASES

Keppel Street, London W.C.1

1941

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MEDICAL AND SANITARY REPORTS FROM BRITISH COLONIES PROTECTORATES AND DEPENDENCIES FOR THE YEAR 1938

[TENTH ANNUAL ISSUE.]

Summarized by P. GRANVILLE EDGE.

WEST AFRICA

COLONY AND PROTECTORATE OF NIGERIA (1938)

The Colony and Protectorate of Nigeria is the largest of the British West African possessions its approximate area, including the area of the Cameroons under British Mandate being 372,674 sq miles or more than three times that of the United Kingdom. It is bounded on the west and north by French territories on the north-east by Lake Chad, on the east by the Cameroons and on the south by the Gulf of Guinea.

Vital Statistics—Compulsory registration continues to be carried out in the areas mentioned in the preceding issue of this *Supplement* and also under the Native Authority Ordinance in Abeokuta, Oyo and Makurdi voluntary registration has been introduced in several areas. Except in the case of Lagos assembled data even for towns where compulsory registration is in force cannot be regarded as reliable greater accuracy is however steadily being attained in these areas. The only data presented in the Report under review relate to Lagos township† where among a population of 158 500 the birth and death rates were 27·0 (corrected 24·0) and 15·8 (corrected 21·6) per 1 000 respectively and the infant mortality rate 127·0 per 1 000 live births.

European Officials resident numbered 2 197 with an average number resident of 1 525 during the year 118 were invalided and 14 died. The number of *African Officials* is not given, but it is stated that within this group 59 were invalided and 39 died.

The average daily strength of the *Nigeria Regiment* (R.W.A.F.F.) was 3,347 of these 28 were invalided and 19 died. The average daily strength of the *Nigeria Police* (African) was 3 741 invalidings numbered 27 and deaths 38.

The Medical Staff (European) during 1938 comprised a Director of Medical Services (Sir R. BRIERCLIFFE C.M.G.) a Deputy Director of Medical Services a Deputy Director of Health Services an Assistant Director of Medical Services and an Assistant Director of Health Services a Deputy Director of Sleeping Sickness Service 10 Senior Medical Officers (one vacancy) 82 Medical Officers (9 vacancies) and 15 Specialists of various grades. The *African Medical Staff* comprised 14 Medical Officers 6 Assistant Medical Officers (one vacancy) 5 Cadet Medical Officers and one Specialist.

Maternity and Child Welfare Work—The continued expansion of this work is one of the most satisfactory features of health activities in Nigeria. For example it is said that in the immediate vicinity of Akure (Ondo Province) 90 per cent of the pregnant women attend the ante-natal clinics and subsequently the Child Welfare Clinics. In this Province trained Native Administration Midwives conducted 525 deliveries. Briefly it may be stated that there are now 24 maternity

† The Annual Report of the Medical Officer of Health Lagos supplies detailed information.

wards in Nigeria having 135 beds and at these centres 3,821 deliveries were recorded. Work at the established *Child Welfare Clinics* continues to increase in volume the aims and objects of the Clinics are becoming better understood and mothers now attend more for help and advice as to the upbringing of their infants than for their treatment when actually sick. The various Religious Missions maintained 53 Maternity and Child Welfare Clinics.

The training of *Government Midwives* was continued in Lagos and Aba where 7 trainees gained the Grade I Certificate at Government and Mission centres in the provinces where similar training is carried out 40 Grade II Certificates were awarded.

School Hygiene—No organized system of medical inspection of school-children exists though it was found possible to examine pupils attending certain schools and training centres in the Provinces while in Lagos the medical inspection of boys in various secondary schools was carried out. By close co-operation with the Education Department much progress was made in improving the hygienic conditions in schools throughout the country (see this *Bulletin* 1935 Supp., pp. 16*-17*)

Public Health Sanitation etc—During the year proposals were approved for the division of the country into eight *Administrative Divisions* each with a Senior Medical Officer in charge, the latter representing the Director of Medical Services in his division. Each Senior Medical Officer having intimate knowledge of conditions obtaining in his territory is therefore able to act quickly in matters of routine and emergency and advise the Director of Medical Services on all medical problems affecting his area. Under the Ordinance empowering the Director of Medical Services to license suitable persons to administer injections (see this *Bulletin* 1935 Supp. p. 23*) during the year under review licences were issued to personnel of the Sleeping Sickness Service other personnel of the Medical Department and Native Administrations, to personnel of Medical Missions and to plantation staffs.

Anti-malarial and anti-animal measures were applied as usual (see this *Bulletin* 1935 Supp., p. 17*) Reclamation work at and around Apapa (Lagos) aerodrome was continued throughout the year many acres of *anopheles* breeding swamps have been obliterated and the mosquito infestation in the area vastly reduced. Under the heading of *sewage disposal* it is said that considerable progress can be reported in the installation of water-carriage systems in Government houses and institutions and in the European residences of commercial firms. These systems are also finding favour with several plantation companies for introduction in their labour camps. Other methods of disposal in use in Nigeria have been described in previous issues of this *Supplement*. Progress is reported in connexion with the provision of improved *water supplies*. In the Southern Provinces work on new major schemes was commenced and in the North the new scheme at Zaria is favourably reported upon. Under the well-sinking programme of the Geological Department 89 wells were completed during the year.

Improvements in *labour conditions* in the plantation areas of the Southern Provinces are reported, notably in connexion with the housing of labourers. Improvement in the medical and sanitary conditions for labourers in the *mines* of the Northern Provinces has been more difficult to bring about. A Medical Officer of Health and a Sanitary Superintendent were appointed to these areas and there are

indications that a satisfactory policy will be agreed upon in the near future (see this *Bulletin* 1939 Supp p 18*)

The work of the Lagos Development Board in connexion with *Housing and Town Planning* continued throughout the year and further progress in the demolition of slum areas and subsequent reconditioning and replanning of the land so acquired was made. In the Northern and Southern Provinces outside the Second Class Townships areas control of housing development is still hampered by lack of legislation and shortage of staff. Special attention was devoted to the question of housing in rural areas at the West African Medical Conference held in Lagos. It is again said that *avitaminosis* particularly among members of the labouring class and poorer school-children is common.

Wide and successful use is made of the display of cinema films for the spread of knowledge of hygiene and health

The training of health personnel was continued at several centres. At Lagos 22 Sanitary Inspectors were in training at the end of the year. At the Ibadan Training Centre 33 pupils passed out and 21 new students were admitted at Kano 23 passed out and 12 were admitted while at Umuahia 28 were in training. A new training centre was opened at Zaria

Port Health Work —During the year under review 938 ocean-going vessels entered and 945 cleared Nigerian ports. At Lagos where 29,353 deck passengers were medically examined no case of infectious disease was recorded. In connexion with cases or suspected cases of yellow fever Degema Opobo and Port Harcourt were for varying periods declared infected areas and the usual precautions observed. *Airport health work* continued to function smoothly at the three anti-army aerodromes and at the three refuelling aerodromes. At Kano and Maiduguri which are the terminal aerodromes 106 mail and passenger aeroplanes were dealt with (see this *Bulletin* 1939 Supp p 18*)

Hospitals Dispensaries etc —No change in the numbers of European and African Hospitals is recorded the details relating to these institutions can more conveniently be summarized in the following manner —

Hospital	Beds	Cots	In-patients			Out patients
			Admitted	Treated	Died	
12 European	143	4	1,517	1,536	33	6 185†
Northern Provinces						
24 African	1 609	44	27,343	28 903	3 414	{ 152 504†
Southern Provinces						
33 African	1,930	158	52,402	54 145		{ 527 421†

[†In the classified hospital returns, out patient totals for Europeans and Africans are given as 8,469 and 645 780 respectively.]

Though no new hospitals were built during the year a considerable number of extensions were made to existing buildings in various areas. At the end of the year there were 337 *Native Administration Dispensaries* an increase of fifteen. Of these 121 were in the Northern and 216 in the Southern Provinces at all dispensaries 691,505 cases were treated (in another place it is said 1 088,396 patients were treated). *Religious Missions* maintain 86 medical stations in the Northern

in 3,271 and *S. mansoni* in 135 while among 15,448 specimens of urine examined *S. haematobium* was found on 413 occasions.

Leprosy—Steady progress is reported in the establishment of leper camps along the lines advocated by Dr. Muir in 1936 in his Report on Leprosy in Nigeria. Seventeen of the 23 Provinces in the country now have their provincial settlements where more than 6,000 lepers are segregated for treatment and training. A large amount of out-patient treatment for non-segregated patients is also provided by hospitals and dispensaries. Hospital returns show that 516 Non-European in-patients and 1,051 out-patients were dealt with.

Venereal diseases and Yaws—The numbers of patients treated at hospitals and dispensaries during the year were for syphilis 17,708 for gonorrhoea and its complications 16,609 and for yaws 55,401. It is again reported that the greatest incidence of yaws is met with in the Southern Provinces (see this *Bulletin* 1939 Supp., p. 23*). So far no organized treatment campaign on a large scale has been possible. In Bamenda an experimental mass treatment of village children with stovarsol administered orally has been instituted with encouraging results. At the Laboratories where 4,232 samples of serum were Kahn-tested 1,815 gave positive and 304 doubtful reactions also among 174 pus smears examined for the presence of *N. gonorrhoeae* 41 gave positive findings while among 29 dark ground examinations of scrapings, etc. for *S. pallida* 7 were positive.

Among other diseases mentioned it is noted that no case of plague has been reported for many years. Rat-destruction squads continued their activities upwards of 50,000 rodents were examined for *P. pestis* but all results were negative. Flea-counts carried out at various stations indicate that the index in respect of *X. cheopis* is very high. Eleven non-Europeans were treated for rabies (4 died) and a total of 380 cases given specific treatment for exposure to rabies infection. The dog was the infecting animal in all cases, the infection being demonstrated in 20 animals two of which were negative histologically but positive on experimental inoculation in mice. *Rickettsialism* was responsible for 39,156 cases and ulcers for 63,682 cases among non-Europeans.

Scientific—The various sections of the Laboratory Service continued to function as described in the previous issue of this *Supplement*. The Report of the Laboratory Service for 1938 appears as an Appendix to the Annual Report under review and presents details of the numbers and nature of the various specimens received and examined and the results recorded. The principal specimens dealt with have been the subject of brief reference in various sections of the preceding notes. Research work at the Laboratory of the African Hospital Lagos was practically at a standstill owing to depletion of staff through leave and invalidings.

Financial—Actual expenditure on Medical Services during 1937-38 amounted to £482,029 in addition Native Administration funds provide a considerable sum of money each year for medical and sanitary purposes.

GOLD COAST COLONY (1938)

The Gold Coast Colony with Ashanti, the Protected Northern Territories and Togoland under British Mandate, is situated on the Gulf of Guinea. It is bounded on the west by the French colony of the Ivory Coast, on the east by the French Mandated Togoland on the north by the colony of the Upper Volta and on the south by the sea. The area of the Colony is 23 937 sq miles of Ashanti 24,379 of the Northern Territories 30 488 and Togoland 13 041 the total being 91 843 sq miles.

Vital Statistics—The mid-year *Native Population* was estimated to number 3 789 909 but in the 35 Registration Areas the population numbered 340 600. In these Registration Areas 11,265 births and 7,530 deaths were registered the resulting birth and death rates being 33.1 and 22.1 per 1 000 respectively. The *infant mortality rate* was 102 per 1 000 births (see this *Bulletin* 1939 Supp. p. 25*).

The *General European Population* (Non-Officials) numbered 4 044 within this group 91 were invalided and 28 died.

European Officials resident numbered 931 with an average number resident of 690. Three deaths and 71 invalidings were recorded. The increased numbers of invalidings causes much concern. Of *African Officials* 4 068 were resident with an average number resident of 3,880. Deaths numbered 14 and invalidings 18.

The *Medical Staff* during 1938 comprised a Director of Medical Services (Dr D. DUFF C.M.G.) a Deputy Director of Medical Services a Deputy Director of Health Services two Assistant Directors of Medical Services, 9 Senior Medical Officers, 52 Medical Officers, 4 Lady Medical Officers and 5 Specialists of various grades. All the former were Europeans and in addition there were 7 African Medical Officers and 3 African Junior Medical Officers.

Maternity and Child Welfare Work—Government Institutions, the Red Cross Society and the Missions continue their activities in this work. At Government centres attendances of expectant mothers numbered 13,937 and of children 25 667. At Red Cross centres the corresponding figures were 21,373 and 34,825 and at Mission centres 11 173 and 46,237 respectively (see this *Bulletin* 1939 Supp. pp. 25*-26*).

The *Annual Report of the Maternity Hospital Accra* is presented as an Appendix to the Report under review. Of the 1,270 patients admitted during the year 583 were labour cases and 450 cases were admitted for ante-natal treatment. Maternal deaths numbered 37 and live births 507. Out patient attendances totalled 15 980 and of these 14,553 were recorded by ante-natal and 1 074 by post natal patients. In the Maternity wards of the Welfare Centres at Accra and Kumasi respectively 541 and 581 in patients were treated.

Midwives and subsidized midwives continue to be trained at the Maternity Hospital Accra. Sixteen new pupils commenced their training during the year. The Hostel now accommodates its full complement of 40 pupils.

School Hygiene—Local Medical Officers of Health keep in as close touch as possible with the schools in their respective districts. In Accra Health Visitors visited the infant schools. 1,544 children were examined and 275 were referred for treatment (no details are given). The nutrition of the school-children and the question of free meals were among matters considered during the year. It was decided to conduct

out-patients numbered 1 460 and of these 1 243 related to the pulmonary form of the disease. In his *Report on the Mining Areas of the Western Province* Dr H P FOWLER observes that while conditions characterizing the deep-mining industry are conducive to the spread of the infection it is impossible at present to hazard the real tuberculosis infectivity rates (see this *Bulletin* 1939 Supp., p 31*). At the Laboratory 571 specimens of sputum were examined and 37.9 per cent were positive with *Mycobacterium tuberculosis*. A large decrease in the number of cases of pneumonia is reported—1 523 cases were treated in hospitals (in-patients and out-patients) and 681 hospital deaths were recorded but in the Gold Coast as a whole 1 117 deaths were ascribed to this cause. In-patients treated for bronchitis numbered 363 (9 deaths) and out-patients 11 873.

Cases of trypanosomiasis treated in hospitals, dispensaries, and camps numbered 8,088 with 151 deaths while in the 35 Registration Areas 157 deaths were registered as due to this cause. Work on the trypanosomiasis survey in the North (see this *Bulletin* 1939 Supp. p. 30*) proceeds satisfactorily and the control measures adopted are already yielding encouraging results. In an Appendix to the Report under review Dr G SARGENT Medical Officer in charge of the Trypanosomiasis Campaign contributes a progress report of considerable interest; this account has been reviewed at some length in this *Bulletin* 1940 Vol 37 p 397. At the Laboratory where 3,904 blood films were examined, trypanosomes were present in 10 of them.

Fever of the enteric group were responsible for 16 registered deaths. Cases of enteric fever reported numbered 110, most of them being recorded in the larger centres where laboratory facilities are available. Instantaneous conservancy systems and unwholesome drainage systems provide every possibility for infection. *Dysentery* caused the deaths of 709 persons during 1938. Hospital returns show that 1,544 patients were treated and of these 798 were amoebic, 161 were bacillary and 587 undefined cases of the disease. Of the 1,544 cases 334 were treated as in-patients (44 deaths) and of these 218 were amoebic and 59 were bacillary infections (see this *Bulletin*, 1939 Supp., p 31). At the Laboratory 3,088 stools were examined microscopically and *E. histolytica* found 43 times, while among 295 faecal specimens bacteriologically examined *Bact. dysenteriae* Flexner was isolated 12 times, Morgan's bacillus 4 times, and *Shigella* once.

Helminthic diseases.—The observations relating to the incidence and distribution of *ankylostomiasis*, *ascariasis*, *taeniasis*, *draconitiasis* and *schistosomiasis* contained in the previous issue of this Supplement (p 32*) do not call for repetition. In-patients and out-patients treated during the year were as follows: *ankylostomiasis* 1 156 cases, *ascariasis* 1,779, *taeniasis* 2,330, *draconitiasis* 1,850 and *schistosomiasis* 968 cases.

Leprosy.—A full account of the work at the Ho Leper Settlement is contained in a special report presented in an Appendix to the Report under review. According to the classified returns 1,201 lepers were treated during the year. There are five established settlements on the Gold Coast the most important being that at Ho which had 238 inmates at the end of the year. 51 new cases were admitted and 46 old cases were re-admitted during 1938. Among 17 nasal smears examined at the Laboratory 8 were positive with *Mycobacterium leprae*.

Genital diseases.—It is said that *syphilis* is not a common disease, and that on the other hand hospital figures give no true index of the incidence of gonorrhoea which is responsible for much disability among

Africans and for a good deal of chronic ill health among female Africans. Returns show that 840 cases of *syphilis* 341 of *soft chancre* 5,357 of *gonorrhoea* and 12 of *granuloma venereum* were treated during the year. At the V D Clinic of the Gold Coast Hospital, Accra 670 new patients were seen and of these 505 were gonorrhoea patients. A marked decrease in the number of cases of *yaws* is reported with a total of 75,519 cases. The geographical distribution of the disease remains as previously described (see this *Bulletin* 1939 Supp p 32*). At the Laboratory 3,589 Wassermann tests were carried out and 1,321 positive reactions recorded. 758 smears were examined and organisms morphologically indistinguishable from gonococci were found in 255 cases.

Other diseases mentioned in the Report under review include the following. During the year 7 in-patients and out-patients were treated for *cerebrospinal meningitis* there were 3 hospital deaths and 7 deaths in the Gold Coast as a whole. Classical *dengue* exists and is reported from time to time. 18 cases (4 in-patients) were recorded during the year.

Filarianis is reported from most stations but in no instance is undue local importance attached to it. Sporadic cases of canine *rabies* were reported from time to time and two fatal human cases were recorded. Preventive measures remain in full force and the whole of the Gold Coast is still a declared infected area. A new menace to health and life is manifest in the reference to the rapid increase in the numbers of mechanically propelled vehicles causing yearly a greater toll of *injuries and deaths*.

Scientific—The Annual Report of the Laboratory Service describes the year's work in some detail. The more important specimens received and findings recorded have already been the subject of brief reference in the preceding notes. The Annual Report of the Analytical Chemist describes the number and nature of various samples examined during 1938.

Included as Appendices to the Report under review are the following *Special Reports*—(a) Two unusual cases of *Malaria*. (b) Report of the Ho Leper Settlement. (c) Report of the Maternity Hospital, Accra. (d) Trypanosomiasis Campaign—Progress Report. (e) Report on the Mining Areas of the Western Province.

Financial—Total expenditure on Medical Department services during 1938 amounted to £349,981 a sum which represents 11.6 per cent of the total expenditure of the Colony during the same year.

SIERRA LEONE (1938)

The Colony and Protectorate of Sierra Leone has an area of nearly 28,000 sq miles, a little less than that of Scotland. The sea coast is 210 miles long and extends from Kiragba on the border of French Guineas to the Mano River on the Border of the Republic of Liberia.

Vital Statistics—Conditions remain as previously described (see this *Bulletin* 1938 Supp p 38* and 1939 Supp pp 33*-34*). For 1938 the recorded facts read as follows—

Area	Popula- tion	Berths	Birth Rate	Deaths	Death Rate	Infant Deaths	I M.R.
Freetown	83,57*	1,463	23.0	1,578	21.5	282	19*
The Colony (ex Freetown)	41,093	1,073	28.1	1,205	29.3	770	25.1
The Protectorate	1,823,636	2,745	?	1,120	?	207	?

European Officials resident numbered 250 with an average number resident of 198. Three were invalided. Of *European Non-Officials* 495 were resident with an average number resident of 372. Ten were invalided and three died. *African Officials* resident numbered 1,032 with an average number resident of 1,000. Thirteen were invalided and six died.

The average strength of *African Troops* (R.M.A.F.F.) was 419. Two deaths were recorded. Three deaths occurred among the 291 men of the *African Police*.

The *European Medical Staff* during 1938 comprised a Director of Medical Services (Dr W. P. H. LIGHTBODY), an Assistant Director of Medical Services (H), three Senior Medical Officers, 16 Medical Officers, one Junior Medical Officer, a Senior Specialist and a Pathologist.

Maternity and Child Welfare Work—During the year 543 patients were admitted to the maternity ward of the Comnaught Hospital and 441 were delivered. 5 maternal deaths were recorded. The new Maternity Hospital nears completion. Successful work continued to be carried out at the various Clinics. The registers of the *Anti-Natal Clinic* show that 938 patients (new cases) made 7,018 attendances. At the *Post-Natal Clinic* 534 new cases recorded 1,323 attendances. The *Infant Welfare Clinics* dealt with 542 children while *Health Visitors* paid 17,722 visits to 783 newly-born babies and 231 children under 3 years of age (see this *Bulletin* 1939 Supp., p. 34*).

School Hygiene—No organized School Medical Service exists in Sierra Leone. It was possible however during the year to make a survey of the Freetown schools and it was found that with four exceptions the standard of hygiene is poor and that cleanliness, lighting, design of buildings, sanitation etc., are below reasonable standards. During this summer 2,711 children were examined. Early signs of *trachoma* and *astigmatism* were common among the children.

Public Health Sanitation etc.—No unusual incidence of disease was reported in the Colony of the Protectorate. Routine *anti-malarial* and *anti-animal* measures continued to be carried out as formerly with the staff available (see previous issues of this *Supplement*). A mosquito survey was commenced in the Protectorate by the Sir Alfred Jones Laboratory: results are presented in an Appendix to the Report under review. For all practical purposes methods of *sewage and refuse disposal* remain as previously described: the numbers of communal latrines and bush memorators have been increased in the Protectorate. As regards *water supplies* a purification plant is in course of erection for dealing with Freetown supplies. New mains were laid and progress is reported in the construction of the Freetown Water Works Extension scheme. In the Protectorate there is no change to report (see this *Bulletin* 1939 Supp., p. 35). *Overcrowding and slum conditions* in Freetown are a grave cause for

concern and Government has appointed a Committee to consider what steps must be taken to bring about improvements. Health conditions of *labourers in mining areas* receive special attention in an Appendix the Senior Health Officer discusses these matters in detail. A *Standing Committee on Nutrition* co-ordinates effort and advises Government on matters concerning nutrition pamphlets on nutrition have been prepared and distributed by this Committee and by the Medical Department To ascertain more accurately the nutritional state in the Protectorate questionnaires have been sent to all Medical Officers

Fifth-grade Sanitary Inspectors and Sanitary Learners received *systematic training in Hygiene* The 1938 celebrations of *Health Week* were the most successful since this feature was inaugurated some years ago.

Port Health Work—During the year 913 ships entered the port of Freetown 1762 deck passengers and 18,824 deck labourers disembarked, and 633 of the former and 3,376 of the latter were vaccinated. A regular air mail service was inaugurated in June between Freetown intermediate ports and Bathurst machines are sprayed with insecticide prior to departure and passengers are examined before departure and on arrival

Hospitals Dispensaries etc—New institutional constructions approach completion The inadequacy of hospital facilities in the Protectorate is a subject of comment a programme of expansion and improvement to be completed in five years is described (see this *Bulletin* 1939 Supp pp 35*-36*) During the year 128 European in-patients and 372 out-patients and 5719 African in patients and 120911 out patients were treated 407 hospital deaths were recorded (all were Africans)

There are 8 *Government Dispensaries* in the Colony and 16 in the Protectorate two new dispensaries were opened in 1938 There are four *Mission Hospitals* subsidized by Government and one other not subsidized *Mining Companies* maintain three hospitals.

The *principal diseases treated* at hospitals and dispensaries included *brouchitis* 14782 cases *malaria* 11132 cases *rheumatism* 9,220 cases *yaws* 7630 cases *wounds and injuries* 7092 cases and *venereal diseases* 5177 cases

The incidence of *malaria* continues to be high with 11132 recorded cases distributed as to 33 *benign tertian* 55 *quartan* 1407 *subtertian* 116 *cachexia* 9515 unclassified and 6 cases of *blackwater fever* The distribution of quinine through the agency of Political Officers and Post Offices continued to function satisfactorily At the Laboratory where 3,259 blood films were examined, 953 were *subtertian* 125 *quartan* and 46 mixed infections.

No case of *yellow fever* was reported though the disease continues to be notified from neighbouring territories. The question of compulsory inoculation of non-natives is under consideration. One section of the Report refers to *eight* non fatal cases of *smallpox* another mentions *fifty-five* 49481 vaccinations were performed. Four non fatal cases of *typhus fever* were notified. At the Sir Alfred Jones Laboratory the study of the murine form of the typhus group was continued the sera of three patients agglutinated *Proteus OX 19* to a diagnostic titre and showed the characteristic rise and fall of titre

There were six non-fatal cases of *trypanosomiasis* a survey of the Kissi area of the Kailahun District is to be carried out.

Typhoid fever was responsible for 22 cases and 6 deaths and *dysentery* for 472 cases with 8 deaths. This is the only information available although a "Return of Diseases and Deaths" appears in the Report, *uses and their differentiation are omitted* and deaths only are mentioned.

In one section of the Report it is stated there were 275 cases of *beriberi* with 34 deaths, but in the classified list of Causes of Death for Freetown 99 deaths appear to have been ascribed to all forms of this disease. At the Laboratory where 333 specimens of sputum were examined 68 were positive with acid-fast bacilli. Again, the Report observes that among 381 cases of *pneumonia* 54 deaths occurred, yet the mortality returns for Freetown alone record 144 deaths due to all forms of the disease.

Leprosy exists but the exact incidence is not known. 139 cases are mentioned with 3 deaths.

Cases of *helminthic diseases* dealt with during the year included *ascariasis* 6,646 *ankylostomiasis* 555 *taeniasis* 269 and *schistosomiasis* 47. At the laboratory, 1,411 faecal specimens were examined. 370 contained *ankylostome* ova, 169 *Ascaris*, 77 *Trichuris* and 10 *Taenia*.

Veneral Diseases.—An increase in incidence is reported the recorded cases being *gonorrhoea* 3,708 and *syphilis* 1,469. The Venereal Diseases Clinic, Freetown, was well attended. 708 new cases were dealt with, gonococcal infections predominating. During the year 7,630 cases of *yaws* were treated. A special *yaws* survey was carried out in three districts of the Northern Province. As a result of this survey it was estimated that in the three districts there are probably upwards of 13,000 cases of the disease.

Other diseases referred to in the Report include 2,624 cases of *arbitaminosis*, 9,220 cases of *rheumatism* and 36 cases of *tetanus* (with 14 deaths). At the *Eye Clinic* 404 new cases were seen. *trachoma* is prevalent (70 cases were dealt with) but acute cases are not numerous nor do the sequelae appear to be so severe or so frequent as is the experience further north in Africa.

Scientific.—The Annual Reports of the Clinical Laboratory of the Connaught Hospital, and of the Sir Alfred Jones Laboratory, Freetown, describe the year's work at these centres. The principal specimens dealt with and findings recorded have been referred to in the preceding notes. In addition to the above Reports, the following are presented: (a) Report of the Senior (Surgical) Specialist, (b) Report of the Eye Clinic, (c) Report of the V.D. Clinic, (d) Report of the M.O.H., Freetown, (e) Report of the Kany Lunatic Asylum, and (f) Report on the Freetown Prisons.

Financial.—Total expenditure on Medical and Sanitary Services during 1938 amounted to £79,580 of which £55,506 represented Medical expenditure.

COLONY OF THE GAMBIA (1938)

The Colony of the Gambia was created in 1843, previously from 1807 has been under the Government of Sierra Leone and was constituted a separate government 43 years later in 1838. It now consists of the island of St. Mary (on which is Bathurst, the seat of Government), British Kumbo, Albrida, the Ceded Mile, the territories of Brefet and Rajana and MacCarthy Island. This last forms the line of demarcation between the Upper and Lower portions of the Gambia River. The total area of the Colony and Protectorate is 4,152 sq. miles.

Total Statistics.—Figures for the Protectorate (when available) are estimates only, not to be regarded as accurate. The estimated

population of the Protectorate is 191 009 no data relating to births, deaths, or infant mortality are available for the Protectorate For *Bathurst alone* the figures read *European population* 233 deaths 14 (12 were non residents) *African population* 14 163 births 429 deaths 363 infant deaths 79

European Officials resident numbered 71 with an average number resident of 61 two were invalided There were 396 *African Officials resident* with an average number resident of 345 within this group 5 invalidings and 8 deaths were recorded.

The Authorized Establishment of the *Medical Department* provides for a Senior Medical Officer (Dr C Wilson) 5 European Medical Officers and 2 African Medical Officers.

Maternity and Child Welfare Work continues with gradually increasing interest of the community at large in the activities of the three established clinics the Sukuta Clinic is now housed in new buildings erected during the year To the Maternity Ward of the Victoria Hospital Bathurst 176 patients were admitted during the year 125 were confinement cases and the remaining 51 were ante-natal post-natal, or gynaecological patients. Babies on the Clinic Registers Bathurst numbered 433 Sukuta 498 and Cape St Mary 90 The following data relate to clinic attendances recorded —

Clinic	Weighing Clinic	General Clinic	Ante-Natal	Births
Bathurst	4,293	4 078	1,560	172
Sukuta	2 635	3,312	82	11
†Cape St. Mary	?	208	47	?

† Work began in November 1938

Six *nurses* sat for the pupil midwives examination four were successful. Their period of training completed three pupil nurses resigned four new nurses are on trial. One nurse succeeded in passing her efficiency bar examination.

School Hygiene—Close co-operation is maintained between the Education and Medical Departments and every effort is made to make both teachers and pupils hygiene minded. School-children are inspected yearly and results recorded on individual cards which are maintained throughout the scholastic career of each pupil. Of 1 789 children on the register 1,383 were medically examined during 1938 the results are set out in great detail in the Report under review More emphasis is being devoted to physical training though at present standards of instruction and supervision are poor improvement will follow when teachers-in training at the Teachers Training School take up their duties in schools The *Report of the Dental Surgeon* observes that 1 620 school-children attending Bathurst schools were examined during the year

Public Health Sanitation etc—The need for the exercise of strict economy made expansion of Medical Department Services impossible yet it is claimed that with a smaller expenditure services were more widely and usefully applied than in the preceding year Medical surveys of certain areas of the Protectorate are envisaged for 1939 when special attention will be devoted to the incidence of leprosy trypanosomiasis, yaws and schistosomiasis. *Anti malarial work*

continues an anti-mosquito gang has been formed and trained and steps have been taken to deal effectively with potential mosquito breeding areas. Drainage remains an important and difficult problem and no effective method of dealing with the crab-hole problem has yet been found (see this *Bulletin* 1933 Supp. p. 45* and 1939 Supp. p. 36*).

The disposal of sewage at Malfa Creek (Bathurst) remains. Experiments directed towards improving methods of disposal in Bathurst continue. A new type of simple septic tank latrine gave good results; the type is being adapted to meet the requirements of wharf towns and rural districts (see this *Bulletin*, 1933 Supp., p. 46* and 1939 Supp. p. 40*). Methods of refuse disposal are said to be satisfactory. Water supplies are satisfactory also. New mains have been laid, and arrangements are being made for periodic bacteriological tests of samples of water.

A complete housing survey was commenced in Bathurst; this undertaking will be completed in 1939. Meanwhile new Building Regulations for application among important towns in the Protectorate were drafted. Under the heading of *Labour* it is observed that seasonal demands for labour have the effect of making the period of maximum unemployment coincide with the unhealthy season and the season when food prices are at their highest. The combination of these factors reacts with unfavourable results upon the physical well-being of the people.

With regard to food in relation to health and disease it is observed that the Medical Officer of Health has been specially charged to devote attention to problems of nutrition. The development of market gardening in the Gambia is an encouraging feature. Vegetables for local consumption are being grown on an increasing scale. Development of local markets continues, attention being paid to the provision of slaughter slabs, fly-proof meat-cages, clean stalls for the sale of food-stuffs, etc.

The training of sanitary personnel—A start was made with the training of selected youths for anti-mosquito duties with a view to their promotion later as Sanitary Assistants in the scheme of sanitary development envisaged for the Protectorate. It is hoped that a sufficient number will have been selected and trained by 1940 to form an efficient team for sanitary duties in rural areas. A special film illustrating the work of the Sanitary Department has been prepared for public exhibition.

During *Health Week* particular attention was devoted to efforts designed to spread knowledge of hygiene and sanitation and efforts met with considerable success.

Port Health Work—During the year 213 ships were boarded and all deck passengers were medically examined. All the 150 aeroplanes and seaplanes landing had clean bills of health; all machines were sprayed on arrival and before departure with Pyrethrum extract. In view of the probable development of an airport at Cape St. Mary, the sanitary control of this area will have to be strengthened.

Hospitals, Dispensaries, etc.—The new Protectorate Hospital at Bansang was completed during the year; the staff of the hospital at Georgetown was transferred to Bansang and the new hospital brought into use in August 1933. A dispensary has been established in part of the old hospital buildings, but the Georgetown Hospital has now reverted to its original use as a prison (see this *Bulletin* 1939 Supp.

p 40*) A bush type waiting room and dressing rooms were added to the Bwiam Hospital.

The Victoria Hospital Bathurst erected in 1854 remains the main hospital of the Colony the building is unsatisfactory and should be replaced by modern hospitals for Europeans and Africans when funds permit

There are six *Dispensaries* serving the needs of the rural districts

Training of Staff is difficult but progress is reported five Dresser-Dispensers have qualified as Dispensers and it is said that four more should do so in 1939 It was found that certain dispensers had been guilty of serious misdemeanours and immediate steps were taken by the Medical Department to deal with these evils and prevent their recurrence. It is suggested that a new grade of worker should be raised similar to the Native Administration Dispensary Attendants in Nigeria three recruits have been enlisted for this grade which can be more quickly trained than Dispensers

The volume of work dealt with during 1938 at treatment centres can be summarized as follows —

Institution	In-patients		Out patients
	Admitted	Treated	
Victoria Hospital Bathurst	1,240	1,274	19,368
European	51	52	142
Protectorate Hospital Bamsang†	351	377	3,632
Bwiam	204	214	7,230
Six Dispensaries	(Figures relate only to principal diseases treated)		

In all hospitals 1 917 patients were treated with 233 deaths.

† The figures for this new hospital include figures for Georgetown also.

Malaria which is markedly seasonal in the Gambia is common to everyone in the country During the year 1 123 cases were treated at hospitals and 526 at the dispensaries of the hospital cases types of infection were *benign tertian* 1 *quartan* 2 *subtertian* 750 and *unclassified* 370 It is said that clinically multiple infections generally obscure the position and make differential diagnosis very difficult. The sale of quinine is being pressed in the Protectorate owing to the physical features of the country anti-larval measures cannot be effectively applied and for the present quinine treatment appears to offer the best line of attack. No case of *blackwater fever* was reported.

No case of *yellow fever* was reported or seen with the following exception. A patient reported to hospital in a very anaemic condition with a history of untreated jaundice starting four weeks previously. Because of the lapse of time between onset and report *jaundice* was made a notifiable disease. The blood of this patient was examined twice with a six week interval the increase in protection shown by the tests showed the patient to have been originally a case of yellow fever. All Europeans are inoculated against yellow fever.

The Report observes of *smallpox* No epidemic occurred and no case of the disease is mentioned (see with respect to a widespread outbreak in 1937 this *Bulletin* 1939 Supp p 41*) Vaccinations performed totalled 1,809. No case of *plague* was reported. 9 662 rats were destroyed and 1 762 carcasses were examined but no case of infection with *P. pestis* was discovered.

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Trypanosomiasis remains as important a public health problem as fever and is common in large areas of the country. Following the survey of Dr J. L. LOCHHEAD in 1937 (see this *Bulletin* 1939 Supp., p. 41) several recommendations for dealing with the problem were submitted. With the exception of steps taken for bush clearance around villages, it has been decided not to carry out those recommendations until much fuller information is available relating to the local distribution and incidence of the disease, types of *Glossina* and their habitat etc. A further survey is to be carried out in 1939 in order to assemble the necessary data which will enable effective control measures to be applied. During the year under review 137 cases of sleeping sickness were treated as hospital in-patients with 49 deaths. 1508 cases were treated among hospital out-patients, and the dispensaries dealt with 286 cases.

Only one (non-fatal) case of *enteric fever* (type undefined) appears in Hospital Returns. According to official returns 140 cases of *dysentery* were treated at hospitals with 2 deaths. Of these cases 27 were treated as in patients, 9 were amoebic, 17 bacillary (one death) and one fatal case where the type of infection was undefined. Among out-patients there were 47 amoebic, 59 bacillary and 7 undefined cases of the disease.

In- and out patients treated at hospitals for *tuberculosis* (all forms) totalled 138 with 16 deaths, and of these 119 cases and 10 deaths were due to the *pulmonary* form of the disease. *Other respiratory diseases* accounted for 6491 cases and 49 deaths and in this group bronchitis was responsible for 5457 cases with 2 deaths, and the *pneumonias* for 230 cases with 44 deaths.

Of *helminthic diseases* the Report observes, "Almost every inhabitant of the Gambia harbours intestinal parasites of some sort. In Bathurst *ankylostomiasis* is commonly met with. *Ascariis* is the rural worm of the lower river while tape-worms become increasingly common as one proceeds up-river. Steps are being taken to improve existing conditions, a new scheme of rural sanitation has been approved by Government and the training of personnel for this scheme is in progress. Hospitals treated 78 cases of *ankylostomiasis*, 854 of *ascariis*, 2 of *dracunculiasis*, 51 of *schistosomiasis* and 64 of *trematodes*. Of *filariasis* dealt with 465 cases of *ascariis* and 19 of *trematodes*. *Of filariasis* 98 cases were recorded and it is said a few cases of *elephantiasis* were seen. Hospital returns show that 115 cases of *elephantiasis* were treated during the year. Dr C. BOWENMAN experimented with intra-arterial glycerine for this complaint and describes his work in the *British Journal of Surgery* Vol. XXVI No. 101.

Leprosy—There are two leper villages in the country one at Frikinal near Bwiam and the other at Buruko near Georgetown (see this *Bulletin* 1939 Supp. p. 42*). At Frikinal 79 lepers were under treatment at Buruko 81 and there were also 7 cases accommodated at the Bathurst Home for the Infirm and the Dispensaries 67 cases of the disease were treated.

Venereal Diseases—It is said that *gonorrhoea* is almost universal among the population of Bathurst though less common in the Protectorate. The sulphonamides proved helpful in the treatment of cases but some form of preventive treatment is necessary if conditions are to improve. Years is much more commonly widespread in the Protectorate than formerly was thought and in some villages the

florid type is very evident. The following records of cases appear in the Report under review —

Treatment Centre	Syphilis	Gonorrhoea	Soft Chancre	Yaws
Hospitals	293	676	28	1 186
Dispensaries	39	679	—	627

Other diseases mentioned in the Report include 312 cases of influenza, 28 cases of *tetanus* (9 deaths), 3 016 cases of *rheumatism* treated at hospitals and 1 453 treated at dispensaries, 830 hospital cases of *disease of the eye and annexa* and 410 cases treated at dispensaries, and 2 254 cases of *diseases of the skin* with *ulcers* accounting for 610 of these cases.

Scientific—The Laboratory Report of the Victoria Hospital Bathurst records the number and nature of specimens received and examined but findings are not recorded. No research work was possible as no member of the staff could be spared for such work.

Financial—Total expenditure on Medical and Health services during 1938 amounted to £31 464 a sum which represents 18·8 per cent of the total revenue or 12 per cent of the total expenditure of the Colony during the same year.

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Only one (non-fatal) case of *enteric fever* (type undefined) appears in Hospital Returns. According to official returns 140 cases of *dysentery* were treated at hospitals with 2 deaths. Of these cases 27 were treated as in-patients, 9 were amoebic, 17 bacillary (one death) and one fatal case where the type of infection was undefined. Among out patients there were 47 amoebic, 59 bacillary and 7 undefined cases of the disease.

In- and out-patients treated at hospitals for *tuberculosis* (all forms) totalled 138 with 16 deaths and of these 119 cases and 10 deaths were due to the *pulmonary* form of the disease. Other *respiratory diseases* accounted for 6 491 cases and 49 deaths and in this group *bronchitis* was responsible for 5 457 cases with 2 deaths, and the *pneumonias* for 210 cases with 44 deaths.

Of *helminthic diseases* the Report observes, Almost every inhabitant of the Gambia harbours intestinal parasites of some sort. In Bathurst *ankylostomiasis* is commonly met with. *Acaris* is the rural worm of the lower river while tape-worms become increasingly common as one proceeds up-river. Steps are being taken to improve existing conditions: a new scheme of rural sanitation has been approved by Government and the training of personnel for this scheme is in progress. Hospitals treated 78 cases of *ankylostomiasis*, 854 of *ascariasis*, 2 of *dracunculiasis*, 51 of *schistosomiasis* and 64 of *taeniasis*. Dispensaries dealt with 465 cases of *ascariasis* and 19 of *taeniasis*. Of *filariasis* 88 cases were recorded and it is said a few cases of *elephantiasis* are seen. Hospital returns show that 115 cases of *elephantiasis* were treated during the year. Dr C. BOWESMAN experimented with intra-arterial glycerine for this complaint and describes his work in the *British Journal of Surgery* Vol. XXVI No. 101.

Leprosy—There are two leper villages in the country, one at Fukinaf near Bwiam and the other at Buruko near Georgetown (see this *Bulletin* 1939 Supp. p. 42*). At Fukinaf 79 lepers were under treatment at Buruko 81 and there were also 7 cases accommodated at the Bathurst Home for the Infirm at the Dispensaries 67 cases of the disease were treated.

Venereal Diseases—It is said that *gonorrhoea* is almost universal among the population of Bathurst though less common in the Protectorate. The sulphonomides proved helpful in the treatment of cases but some form of preventive treatment is necessary if conditions are to improve. *Syphilis* is much more commonly widespread in the Protectorate than formerly was thought and in some villages the

florid type is very evident. The following records of cases appear in the Report under review —

Treatment Centre	Syphilis	Gonorrhoea	Soft Chancre	Yaws
Hospitals	293	676	28	1 186
Dispensaries	39	879	—	627

Other diseases mentioned in the Report include 312 cases of *influenza*, 28 cases of *tetanus* (9 deaths), 3 015 cases of *rheumatism* treated at hospitals and 1 453 treated at dispensaries, 830 hospital cases of *diseases of the eye and annexa* and 410 cases treated at dispensaries, and 2,254 cases of *diseases of the skin* with *ulcers* accounting for 610 of these cases.

Scientific—The Laboratory Report of the Victoria Hospital Bathurst records the number and nature of specimens received and examined but findings are not recorded. No research work was possible as no member of the staff could be spared for such work.

Financial—Total expenditure on Medical and Health services during 1938 amounted to £31 464 a sum which represents 18·8 per cent. of the total revenue or 12 per cent. of the total expenditure of the Colony during the same year.

Trypanosomiasis remains as important a public health problem as ever and is common in large areas of the country. Following the survey of Dr J. L. LOCHHEAD in 1937 (see this *Bulletin* 1939 Supp. p. 41) several recommendations for dealing with the problem were submitted. With the exception of steps taken for bush clearance around villages, it has been decided not to carry out those recommendations until much fuller information is available relating to the local distribution and incidence of the disease, types of *Glossina* and their habitat etc. A further survey is to be carried out in 1939 in order to assemble the necessary data which will enable effective control measures to be applied. During the year under review 137 cases of sleeping sickness were treated as hospital in-patients with 49 deaths, 1,506 cases were treated among hospital out-patients and the dispensaries dealt with 236 cases.

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Genital Diseases.—It is said that *gonorrhoea* is almost universal among the population of Bathurst though less common in the Protectorate. The sulphonamides proved helpful in the treatment of cases but some form of preventive treatment is necessary if conditions are to improve. *Yaws* is much more commonly widespread in the Protectorate than formerly was thought and in some villages the

the training of African personnel has yet been established (see this *Bulletin* 1939 Supp p 46*)

Port Health Work —During the year 711 steamships and 1 708 dhows entered Kilindini harbour 13 073 passengers were inspected under special smallpox regulations and 88 were landed subject to surveillance. Upwards of 25 000 rats were trapped 603 were examined but none was infected with *P. pestis* [The Laboratory Report states that 2 rats among 30 examined were infected]. The position in regard to airports remains unchanged (see this *Bulletin* 1938 Supp p 52*). Anti-mosquito measures continued to be carried out at all authorized landing grounds.

Hospitals Dispensaries etc —The chief administrative problem seems to be how to meet the growing demands of the African population for indoor and outdoor medical relief throughout the year almost every Government African hospital was overcrowded (see this *Bulletin* 1939 Supp p 46*). The Report states that 1 704 European in patients and 4 748 European out patients and 51 029 Asiatic and African in patients and 492,589 Asiatic and African out patients were treated at hospitals and dispensaries and that in addition 687 910 cases were dealt with at out-dispensaries in the Native Reserves. [These figures do not agree with the figures in the classified returns]. To *Prison Hospitals* 3,571 patients were admitted and 63 died. Admissions to the *Mathari Mental Hospital* numbered 160 discharges 111 and 31 patients died.

Eight *Mission Hospitals* treated upwards of 10 000 in patients and upwards of 115 000 out patients large numbers were also treated at out-dispensaries but the figures are supplied for five centres only.

Adequate facilities for the training of African female nurses have so far been lacking but it is hoped this may be remedied when the new Group Hospital at Nairobi is brought into commission. The training of African Hospital Assistants and Compounders was continued twelve recruits commenced their training as hospital assistants and of seven compounders under instruction, two passed the final examination.

Malaria continues to be the principal cause of morbidity and during the year 35 551 cases were treated in hospitals and dispensaries (exclusive of those treated at out-dispensaries). The distribution of types of infection reads benign tertian 730 quartan 599 subtertian 8 434 clinical 25 483 cachexia 276 and cerebral 29. Of the total cases recorded 581 were Europeans (303 in patients 1 death). Of blackwater fever 23 cases and 4 deaths were recorded, 10 of the cases and 2 of the deaths occurring among Europeans. At the Laboratory 18,254 blood films were examined and 2,366 were found to contain malaria parasites the positive findings being *P. falciparum* 1,842 *P. falciparum* (crescents) 253 *P. vivax* 31 *P. malariae* 114 *P. ovale* 3 and mixed infections 123. Also at the Clinical Laboratory Mombasa, where 8,232 blood films were examined 1 617 contained *P. falciparum* (crescents) 52 *P. malariae* 18 *P. vivax* 2 *P. ovale* and 17 mixed infections.

In regard to yellow fever (see this *Bulletin* 1939 Supp p 48*) it is stated that during the year a beginning was made to reduce the *Aedes* index in Mombasa. No case of smallpox was recorded 18 320 vaccinations were performed. Twenty-seven cases of plague were reported, the smallest number noted in the past twenty years hospital returns show that 22 cases were treated with 19 deaths. Reported cases of typhus numbered 24 of the 21 in patient cases treated 15 were

EAST AFRICA

KENYA COLONY AND PROTECTORATE (1938)

Kenya Colony and Protectorate is in Eastern Equatorial Africa. It is bounded on the north by Abyssinia and the Sudan, on the west by Uganda, on the south by Tanganyika Territory and on the east by the Indian Ocean and Italian Somaliland. The total area is 224,900 sq. miles and is divided into nine provinces: Nyanza, Nroia, Turkana, Rift Valley, Masai, Kikuyu, Uluamba, the Coast and the Northern Frontier Provinces. Its capital is Nairobi and Mombasa the principal port.

Vital Statistics—No machinery yet exists for the registration and analysis of vital facts (see previous issues of this *Supplement*) and in the absence of necessary information, birth, death and infant mortality rates cannot be calculated. The estimated population at the end of the year was 3,305,891 comprising 20,894 Europeans and Whites, 3,280,777 Africans, 15,851 Arabs and others, 44,633 Indians and 3,734 Goans.

European Officials resident numbered 1,964 with an average number resident of 1,454. 4 deaths and 14 invalidings were recorded. Non-European Officials resident numbered 2,517 with an average number resident of 2,181. within this group there were 10 invalidings and 8 deaths.

The European Medical Staff during 1938 comprised a Director of Medical Services (Dr A. R. PATERSON, C.M.G.) a Deputy Director of Medical Services, 3 Senior Medical Officers and 47 Medical Officers (the latter includes 6 Specialist appointments of various grades). The Non-European Medical Staff consisted of 2 Assistant Surgeons and 24 Sub-Assistant Surgeons (Africans).

Maternity and Child Welfare Work continues to be carried out by the Government Medical Department, the Missionary Societies, the Lady Grigg Welfare League and the Municipal Council of Nairobi along the lines previously described (see this *Bulletin* 1939 Supp. pp. 44-45). The record of the year's maternity work reads: (a) dealt with at Government Hospitals and at centres established with the help of Local Native Council Funds, 2,622 cases, (b) at the Lady Grigg Maternity Centres, 1,290 cases, and (c) at Mission Hospitals, 1,129 cases.

School Hygiene—There is no special school medical service (see previous issues of this *Supplement*). In Nairobi a daily ration of milk was given to all African school-children throughout the year and important data were collected. the results of the experiment are to be published.

Public Health Sanitation, etc.—No changes of importance took place either in departmental administration or in the general system of public health administration. The Abyssinian Refugee Camp on the border of the North Frontier District continued in being throughout the year, the condition of all refugees steadily improved. Routine anti-malarial activities were maintained. marked progress was reported in connexion with the Kisumu scheme and considerable improvements effected in the organization of control measures in the Mombasa area. There is nothing new to report in connexion with general measures of sanitation. water supplies are not mentioned. No marked change took place with regard to the conditions under which African labourers are crated, housed and fed, etc. The usual measures continued to be taken to spread the knowledge of hygiene and sanitation. No school for

the training of African personnel has yet been established (see this *Bulletin* 1939 Supp p 46*)

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Europeans. There were 443 cases of *cerebrospinal fever* with 147 deaths, 164 cases of *anthrax* with 9 deaths, and 21 cases of *undulant fever* with 2 deaths. At the Laboratories 223 specimens of cerebrospinal fluid were examined and the meningococcus was present in 108.

Of the 18 cases of *diphtheria* reported 10 occurred among Europeans. At the Medical Research Laboratory 79 out of 488 swabs examined were positive with *C. diphtheriae*. An investigation of the types of *C. diphtheriae* found in positive cases in Kenya was undertaken and results are to be published. The text of the Report makes no mention of *relapsing fever* (see this *Bulletin* 1939 Supp. p. 48*) but the classified returns show that 218 cases (Native general population) were admitted to hospital and 9 deaths were recorded.

In one section of the Report it is stated that 1 443 cases of *tuberculosis* (all forms) were treated, but according to the classified returns it would appear that 1 134 in-patients were treated (8 were Europeans) and there were also 382 out-patients making a total of 1 516 cases. Among the 6 European in-patient cases 5 were *pulmonary* (one death) and among the 1 128 non-European cases 753 were *pulmonary* with 194 deaths. Records of cases treated are no true index of the actual incidence of the disease. At the Laboratories 2 088 specimens of sputum were examined and 349 were positive with *Mycob. tuberculosis*. During the year under review 4 825 cases of *pneumonia* were treated in Government Hospitals with 852 deaths. At the Medical Research Laboratory the therapeutic value of M. & B. 693 was tested. Influenced by the results obtained (which were published in the *Lancet*) Government made provision in the 1939 estimates for the purchase of sufficient quantities of this drug for the treatment of all hospital cases of *pneumonia*. In- and out-patients treated for *bronchitis* numbered 58 725 and for *asthma* 1 073. Of these 286 cases of *bronchitis* and 13 cases of *asthma* occurred among Europeans.

The Report states that "274 cases of the *enteric group* of fevers were treated" but classified returns show there were 280 cases with 83 deaths and of these 12 cases and 2 deaths occurred amongst Europeans. There were also 8 out-patient cases. Of *dysentery* there were 1 657 *amoebic*, 117 *bacillary* and 1 146 undefined cases. At the Laboratories where 17 404 faecal specimens were examined *E. histolytica* was present in the amoeboid form or as cysts in 897 cases.

The incidence of *human trypanosomiasis* remained low during 1939 and only 17 cases were reported. Work was continued in South and Central Kavirondo in the extension of the "block method" of controlling the incidence of fly (see this *Bulletin* 1939 Supp., p. 49*).

Helminthic diseases—Cases treated during the year were *taeniasis* 54,287 *ascariasis* 10,534 *ankylostomiasis* 2,465 and *schistosomiasis* 1 020. At the Laboratories where 11 643 faecal specimens were examined the findings of ova of helminths included *ankylostomes* 2,855 *Taenia* 2,263 *Trichouris* 2,253, *Ascaris* 1,969 and *S. mansoni* 440. The discovery of *Onchocerca volvulus* is reported in a specimen received by the Section of Pathology. *Onchocerciasis*, which has always been regarded as a rarity is said to be common in certain districts.

The only reference to *leprosy* mentions that 268 cases were under treatment during the year (see this *Bulletin* 1939 Supp. pp. 49*–50*). At the Mombasa Laboratory 13 smears were examined and 4 showed the presence of *Mycob. leprae*.

Internal diseases—The established clinics continued to function at the centres described in previous issues of this Supplement. During

the year an expedition equipped for the diagnosis and treatment of venereal diseases was sent out on tour among the pastoral and semi-nomadic Masai the experiment proved highly successful. According to the classified returns in and out patients treated were for *syphilis* 8,500 for *soft chancre* 52 for *gonococcal* infections 4,389 and for *granuloma venereum* 5. Cases of all forms of venereal disease among Europeans totalled 29. At the Medical Research Laboratory the Kahn test was applied to 4,976 samples of sera with positive reactions in 1,789 and doubtful reactions in 254 cases, and at the Mombasa Laboratory *N. gonorrhoeae* was identified in 263 out of 637 smears examined. Cases of *yaws* treated during the year numbered 12,402.

Special provision is made for treatment of diseases of the eye (see this *Bulletin* 1939 Supp. p. 50*). According to the classified returns 21,913 cases were dealt with, 1,339 of them as in patients. External causes, *ulcers* and *rheumatism* continue to be frequent causes of disability.

Scientific—Dr F. W. VINT again contributes an annual report of the work and findings of the *Medical Research Laboratory*; the numbers of specimens received and findings recorded, vaccines manufactured etc. are classified in a series of tabular statements. The principal specimens examined have been the subject of brief mention under various headings in the preceding notes.

Research work included a small survey of pneumococcal types in pneumonia, and an investigation of the types of *C. diphtheriae* found in positive cases in Kenya. Work on the subject of *nutrition* and on the production of a *water soluble bismuth preparation* was continued. In another Appendix work at the Clinical Laboratory at Mombasa is discussed. *Scientific papers* published included the following—

DOWDSEWELL (R. M.) *Schistosomiasis in the Kavirondo District of Kenya Colony*—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938 Vol. 31 p. 673.

ANDERSON (T. F.) *Treatment of Pneumonia with M. & B. 693 (with a note on the Bacteriology by R. M. DOWDSEWELL)*—*Lancet* 1939 Vol. 1 p. 252.

Financial—Actual expenditure on Medical Department Services during the year amounted to £227,378 as compared with a sanctioned estimate of £218,088.

UGANDA PROTECTORATE (1938)

The Uganda Protectorate lies in the northern part of the Great Lakes region of Africa. It has no sea coast, being bounded by the Anglo-Egyptian Sudan on the north, Kenya Colony on the east, Lake Victoria Nyanza and the Tanganyika Territory on the south and the Belgian Colony on the west. The area of the Protectorate is estimated at 94,204 sq. miles including 13,616 sq. miles of water. (The area of England without Wales is a little over 50,000 sq. miles.) The headquarters are at Entebbe and the chief commercial towns are Kampala and Jinja. All three are on or near the north shore of Lake Victoria.

Vital Statistics—In the following Table the relevant facts for the native population only are summarized—

Europeans. There were 443 cases of *cerebrospinal fever* with 147 deaths, 164 cases of *anthrax* with 9 deaths, and 21 cases of *undulant fever* with 2 deaths. At the Laboratories 223 specimens of cerebrospinal fluid were examined and the meningococcus was present in 108.

Of the 16 cases of *diphtheria* reported 10 occurred among Europeans. At the Medical Research Laboratory 79 out of 486 swabs examined were positive with *C. diphtheriae*. An investigation of the types of *C. diphtheriae* found in positive cases in Kenya was undertaken and results are to be published. The text of the Report makes no mention of *relapsing fever* (see this *Bulletin* 1939 Supp. p. 48*) but the classified returns show that 218 cases (Native general population) were admitted to hospital and 9 deaths were recorded.

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Other diseases.—The established clinics continued to function at the centres described in previous issues of this Supplement. During

	Lady Coryndon School		Nsambya School	
	To Wards of the School	To 21 Country Centres	Wards of the School	14 Country Centres
Total Admissions	567	—	500	—
Confinements	413	1 653	414	1,921
Live Births	362	1,559	363	1,836
Infant Deaths	20	53	23	30
Maternal Deaths	27	6	15	8
New Ante-Natal Cases	1 061	10,774	892	6 825
Infant Welfare Cases	562	11 799	363	1 187

At the Nsambya Maternity Training School there were between 35–40 students in training seven passed the examination of the Uganda Midwives Board (see also under *Hospitals* below)

School Hygiene—The examination of school-children in selected schools was continued. A distinct improvement in school buildings is reported and it is stated that great efforts have been made by the various Mission Societies to bring dormitory and schoolroom accommodation into line with the School Building Rules. Free medical treatment has been made available for those Assam school-children whose parents desire it. In various parts of the country African school-children have been given supplementary milk, skimmed milk, vegetables, and meat. The results of these investigations show that significant increases in height and weight occur in those given milk and meat but that vegetables and skimmed milk appear to have little or no effect (see this *Bulletin* 1939 Supp. p. 53*)

Public Health Sanitation etc—The Report observes that arrangements have been made for handing over executive responsibility for provincial matters to the senior medical officers in charge of provinces from 1st January 1939. Under the new scheme of decentralized control the Headquarters of the Department will formulate the general medical policy for the country, leaving its detailed working out in each province to the senior medical officer with supervisory control by the central organization.

Considerable attention was devoted to and progress reported in all branches of anti-malarial work. extensive draining of swampy areas, filling in of depressions, planting with eucalyptus are among matters referred to in some detail. The original restricted water borne sewerage scheme for Kampala was completed (see this *Bulletin* 1938 Supp. p. 58*) and extensions to cover the whole township including Mulago and Makerere are now being made. In Entebbe progress is again reported in the installation of septic tank systems for European houses. The difficulties of night-soil disposal in rural areas still remain unsolved, but in Fort Portal it is said a modification of the Indore Method has been instituted with very satisfactory results.

Special attention was devoted during the year to the improvement of water supplies both urban and rural. In rural areas better and more convenient supplies are urgently required especially in the drier parts of the country where springs and streams are scarce. The Geological Survey Department provided valuable assistance by sinking bore-holes and constructing collecting tanks to conserve storm water while efforts continue to be made to protect spring and well supplies from pollution.

Province	Estimated Population	Live Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Buganda	884 445	20 862	23.3	14 656	16.4	1 449	69.8
Eastern	1 197 644	29 822	24.9	21 232	17.9	4 054	135.9
Western	5 557	22 788	30.2	11 497	15.3	2 139	93.8
Northern	615 541	24 773	29.8	16 534	20.3	6 746	277.9
The Protectorate	3 660 220	97 757	26.7	64 066	17.5	14,353	147.2

European Officials resident numbered 652 with an average number resident of 522. Four were invalided and two died. Among *European Non-Officials* 11 deaths were recorded and 2,201 cases of sickness were treated by Government Medical Officers. *malaria* was responsible for 384 of the cases treated.

Asian Officials resident numbered 406 with an average number resident of 345. Three were invalided, but no deaths were recorded. Among *Asian Non-Officials* 74 deaths were reported while Government Medical Officers treated 7 692 cases of sickness with *malaria* as the principal cause of ill-health.

African Officials (African Civil Service) resident numbered 183 with an average number resident of 183. No invalidings or deaths were recorded among this group.

The Sanctioned Establishment of the Medical Department provides for a Director of Medical Services (Dr W. H. KAUSTZ, C.M.G.) a Deputy Director of Medical Services, an Assistant Director of Medical Services, 43 European Medical Officers of various grades (including specialized appointments), 12 Sub-Assistant Surgeons and 31 Senior African Medical Assistants.

Maternity and Child Welfare Work continues to take up a very large share of the time of Medical Officers and Sisters in all districts. Two new centres were opened and many existing centres improved or even completely rebuilt. During the year under review 20,861 expectant mothers attended the various centres (all were new cases) and of these 2,417 terminated their pregnancies in hospitals or at maternity centres, while a further 593 who had not availed themselves of ante-natal treatment were also delivered in hospitals. The 2,417 women who attended ante-natal clinics were delivered of 2,211 live babies and 28 women died in childbirth. For the other 593 women, 357 live births and 60 maternal deaths were recorded (see this *Bulletin* 1939 Supp., p. 52*).

The *Child Welfare Clinics* continue to be well attended. 27,208 infants were dealt with at centres during the year under review. There persists a constant demand in all districts for the establishment of additional centres. The provision of as many centres as are really necessary is not possible until African nurses attain a higher standard of education and training.

The Reports on the *Lady Corvudon Maternity Training School* and the *Nsamia Maternity Training School* supply the following details of work dealt with during 1938 —

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New Ante-Natal Cases	1 061	10 274	892	6,825
Infant Welfare Cases	562	11 790	363	1 187

At the *Nsambya Maternity Training School* there were between 35–40 students in training seven passed the examination of the Uganda Midwives Board (see also under *Hospitals* below)

School Hygiene—The examination of school-children in selected schools was continued. A distinct improvement in school buildings is reported and it is stated that great efforts have been made by the various Mission Societies to bring dormitory and schoolroom accommodation into line with the School Building Rules. Free medical treatment has been made available for those Asian school-children whose parents desire it. In various parts of the country African school-children have been given supplementary milk, skimmed milk, vegetables, and meat. The results of these investigations show that significant increases in height and weight occur in those given milk and meat but that vegetables and skimmed milk appear to have little or no effect (see this *Bulletin* 1939 Supp. p. 53*)

Public Health Sanitation etc—The Report observes that arrangements have been made for handing over executive responsibility for provincial matters to the senior medical officers in charge of provinces from 1st January 1939. Under the new scheme of decentralized control the Headquarters of the Department will formulate the general medical policy for the country leaving its detailed working out in each province to the senior medical officer with supervisory control by the central organization.

Considerable attention was devoted to and progress reported in all branches of *anti malarial* work. extensive draining of swampy areas, filling in of depressions, planting with eucalyptus are among matters referred to in some detail. The original restricted water borne *sewerage* scheme for Kampala was completed (see this *Bulletin* 1938 Supp. p. 58*) and extensions to cover the whole township including Mulago and Makerere are now being made. In Entebbe progress is again reported in the installation of septic tank systems for European houses. The difficulties of night-soil disposal in rural areas still remain unsolved but in Fort Portal it is said a modification of the *Indore Method* has been instituted with very satisfactory results.

Special attention was devoted during the year to the improvement of *water supplies* both urban and rural. In rural areas better and more convenient supplies are urgently required especially in the drier parts of the country where springs and streams are scarce. The Geological Survey Department provided valuable assistance by sinking boreholes and constructing collecting tanks to conserve storm water while efforts continue to be made to protect spring and well supplies from pollution.

UGANDA (1938).

Housing conditions for European, Asian and African Officials are being improved in most areas (see this *Bulletin* 1939 Supp., p. 53*) Dr. Kauntze refers to the difficulties facing the authorities in their efforts to provide the African peasant with hygienic houses at costs within the reach of the average cash incomes of peasant families (see this *Bulletin* Supp. p. 53*). Experimental schemes are being tried out—in some areas with considerable success. The standard of labour continues to improve in some areas where labourer commence work in poor condition, improvement follows as a result of the better rations provided by their employers. The special commission appointed to investigate labour conditions in Uganda issued its report just before the close of the year.

With regard to food in relation to health and disease it is reported that the Nutrition Sub-Committee of the Agricultural Survey Commission continued their work during the year under review (see this *Bulletin* 1939 Supp. p. 53*). A Medical Officer Dr. LOEWENTHAL was seconded to undertake nutrition surveys in different parts of the country. The main results obtained suggest that nutritional defects are partly due to qualitative and partly to quantitative food deficiencies in association with climatic, social, and economic factors. The results of an experiment arranged by Dr. Loewenthal for their poor physique hundred labourers, members of a tribe notorious for their poor physique and inefficient work, were given a full diet which included meat and additional medical treatment. The results showed that "these men could be given the hardest manual labour and become as good as any other type of labourer in physical condition and output of work." Dr. Loewenthal has developed a health index based upon observable facts rather than upon the clinical assessment of a nutritional state his methods are explained in a paper published in the December 1938 number of the *East African Medical Journal* (see *Bulletin of Hygiene* 1939 p. 497).

Health propaganda continued to be carried out in all districts. *Medical Education*—The future of medical work in Uganda is dependent upon the training of Africans to a standard which will enable them to take over many of the duties at present performed by Europeans. Following upon the recommendations of the Makerere Commission (see this *Bulletin* 1939 Supp. p. 51*) the Makerere College Ordinance passed towards the end of the year had the effect of placing the College under the control of a Council and of making the Medical School one of the Faculties of the College. The number of medical students was much the same as in previous years. The Annual Report of the Uganda Medical School supplies details of the year's work.

The Training of Nurses, Nursing Orderlies and Dispensers continued as usual the following results are recorded—

	Candidates	14 passed	Results.
Male Nursing Orderlies	19	6	1st examination
	13	5	2nd
	5		1st
	2	8	2nd
Female Nurses	10		1st
	2	2	2nd
Dispensers	3		Final

Training of African Sanitary Inspectors—The new East African Examining Board for Sanitary Inspectors formed under the auspices of

the Royal Sanitary Institute held its first examination in December Out of 10 African candidates 8 were successful. This satisfactory result is attributed to the excellent course of training provided by Mr JORDAN the Instructor in Hygiene

Hospitals Dispensaries etc.—The new hospital at Tororo was opened in the early part of the year and has proved very popular a new hospital in course of construction at Kitgum approaches completion. The extensions to the Jinja Hospital are ready for occupation (see this *Bulletin* 1939 Supp p 54*) Considerable extensions to existing accommodation are to be carried out at the Mulago Hospital Minor improvements were carried out at most station hospitals

A complete *dispensary scheme* for the whole country is being prepared by provincial medical officers. The scheme envisages (a) a central hospital as the main unit (b) a dispensary in each *saza* (c) a ring of first-aid posts based on the dispensaries and visited by itinerant staffs. The scheme aims at providing medical aid within five miles of the majority of the people in the Protectorate The aid posts will not be treatment centres only they will be health and social centres aiming to educate the neighbouring natives in the way of healthy living A summary of the volume of work dealt with during 1938 at hospitals and dispensaries reads as follows —

Hospitals	Beds	Admissions	Treated	Died	New Cases In- and Out Patients
4 European	34	531	34 340	1,868	3 407
9 Asian	59	1 318			9,384
23 African	1 296	31 741			374 139
107 Dispensaries	633	?	—	—	712,301

As regards general *morbidity experience* during the year under review it is said that there is little to report in connexion with *endemic disease* and that *epidemic diseases* have not occurred to any degree The notes which follow briefly summarize the principal references to specific diseases mentioned in the Report for 1938

A further increase in the number of cases of *malaria* is recorded, viz 78,240 According to the tabulated facts 37,264 cases were treated at station hospitals and of these 3 757 were treated as in patients and 115 died The remaining 40,976 cases were dealt with at the dispensaries Among the 37,264 cases treated at station hospitals the distribution of types of infection was *benign tertian* 569 *quartan* 1,338 *subtertian* 10,210 and *undclassified* 25 147

Of *blackwater fever* 163 cases with 34 deaths were reported 85 of these cases (22 died) were treated by Government Medical Officers. The racial distribution of cases reads Europeans 5 (non fatal) Asians 144 (31 deaths) Africans 14 (3 deaths) The incidence and distribution of the disease in Uganda continues to be set out in admirable detail (see this *Bulletin* 1939 Supp p 55*)

The work of the *Yellow Fever Institute* was continued the survey being confined to the West Nile District and Bwamba County in the Toro District. All attempts to isolate the yellow fever virus have so far failed, though several other interesting viruses have been discovered by the *Rockefeller Foundation* in the course of their investigations.

An unidentified virus was isolated from 8 cases in the Bwamba area these investigations continue (see also this *Bulletin* 1939 Supp. p. 55*)

The incidence of *plague* has remained low 335 cases with 576 deaths being reported as compared with 515 cases and 478 deaths in the preceding year. The local distribution of cases and deaths was as follows —

	Cases	Deaths
Bupanda Province	154	134
E. tern	215	206
Northern	16	16
Western	Nil	Nil

Only one case occurred in the township of Kampala where rat trapping continues to be carried out as a routine measure. The carcasses of upwards of 150 rats were examined microscopically and *P. pestis* was found present in only one case. In view of the discovery of *R. rattus* in the railway godowns in Bunyoro (Northern Province) measures are being taken to keep railway premises as free as possible from rodents. In his Report the Government Entomologist observes that as the result of field tests the further use of letrats does not appear to be justified (see this *Bulletin* 1939 Supp. p. 56*). Rat and flea surveys continued to be carried out in various areas. In Tororo no *Y. cheopis* occurred, the common flea being *Y. transmansi*. On the other hand a flea greatly resembling and closely related to *Y. cheopis* was found on field rats. This insect is a new species *Y. basilarum* and its discovery may serve to explain some apparent anomalies which appear to have characterized the distribution of rats and fleas in Uganda.

Of *relapsing fever* 493 cases were reported and of these 339 were microscopically diagnosed. 270 cases were admitted and 277 were treated in hospitals with 16 death. Two cases only of typhus were recorded. Carnie's disinfectant (see this *Bulletin* 1938, Supp. p. 47*) was used throughout the year in Uganda and no case of the disease was reported from this district. Sporadic cases of *cerebrospinal fever* were reported but though the total cases (353 cases 167 deaths) and deaths were higher than in 1937 it is said there was nothing in the nature of an epidemic during the year under review. The segregation of contacts continues. No case of *smallpox* was notified, but vaccination was continued in all districts special attention being paid to school children. Trial was given to the special method of semi-intradermal vaccination recommended in the *British Medical Journal* (May 22nd, 1937 pp 1068-1068 see *Bulletin of Hygiene* 1937 v. 12, p. 764) with such satisfactory results that instructions for the general adoption of the method throughout the Protectorate have been issued. During the year 170,034 vaccinations were performed.

Typhus anisalis. — During the year 684 new cases of the disease with 6 deaths were recorded. There was much the same incidence of sleeping sickness in the West Nile District as in the preceding year.

It is believed that the situation in the West Nile District is now under control, as the investigations of the Government Entomologist over a period of six months show that the rod type of clearing (see this *Bulletin* 1939 Supp. p. 58*) is reasonably effective in lowering the density of the fly and is probably more efficient as it is certainly less costly than the large deep clearings previously advocated. Control work is described at some length in the section Hygiene and Sanitation of the Report under review. The pass system (see this *Bulletin*

1938 Supp p 115*) controlling movements of population across the Uganda Sudan border is working satisfactorily but that dealing similarly with immigration through Tanganyika appears to have fallen into disuse representations for re-establishment of the system have been made

At Government Hospitals 561 in and out patient cases of *tuberculosis* (all forms) were treated and of these 461 were cases of the *pulmonary* form of the disease hospital in patients treated for phthisis numbered 244 with 60 deaths and for other forms of tuberculosis 69 cases with 18 deaths. Other affections of the *respiratory system* were responsible for 37 673 cases of sickness among them 2 528 cases of *pneumonia* (all forms) with 461 deaths, and 5 771 cases of *bronchitis* with 10 deaths

An increase in the incidence of *enteric fever* is reported of the 151 cases treated at hospitals 142 were admitted during the year and 37 deaths were recorded. At the Government Laboratory 411 agglutination tests were applied to samples of sera but results are not stated. Hospital Returns show that 2 116 cases of *dysentery* were dealt with among in and out patients the distribution being as follows —

Type	Hospital Admissions 1938	Hospital Deaths All cases	In and Out patients
Amoebic	209	12	630
Bacillary	187	12	349
Unclassified	121	7	1 137

Other diseases of the *digestive system* accounted for 41 049 cases of sickness *diarrhoea* and *enteritis* proving responsible for 7,217 of the total cases recorded in this group

At the Government Laboratory all faecal specimens in any way suggestive of *dysentery* were examined as a routine measure Among the 305 specimens dealt with, *Bact dysenteriae* (Flexner) was identified in 40 cases *Bact dysenteriae* (Schmitz) in 7 and *Bact dysenteriae* (Sonne) in 2 cases.

Under the title *helminthic diseases* are recorded only those patients whose symptoms are diagnosed as due to the presence of intestinal parasites many other infections are discovered by the routine examination of stools of *in-patients* Of *ankylostomiasis* 2 036 cases were recorded the infection appears to be widespread and Medical Officers in various areas report that from 10 to 80 per cent of the stools examined contained *ankylostome* ova. The year's experience in connexion with *helminthic diseases* may be summarized as follows from published Hospital Returns —

Infection	Total Cases Treated	In-patients only
<i>Ankylostomiasis</i>	2 036	677
<i>Schistosomiasis</i>	247	103
Other helminths (mainly <i>Ascaris</i> and <i>Taenia</i>)	2 920	314

With regard to *filariasis* (see this Bulletin 1939 Supp p 57*) it is stated that *Onchocerca volvulus* has now been recorded in Toro and Kigezi (Western Province)

Leprosy—Better accommodation for lepers has been provided at all settlements from the special building grant which Government has been making for the past two years, and the wattle and daub huts are gradually being replaced by brick houses. Dr Mura, of the British Empire Leprosy Relief Association, visited each of the settlements as a result of his recommendations a Toci worker is to be appointed to the Bunyoni Leper Colony to introduce there vocational therapy. Detailed references to the activities of the *Mission Leper Colonies* testify to the admirable work which continues to be carried out at these institutions, where 1 739 lepers were under treatment.

General Diseases—By comparison with 1937 experience (see this *Bulletin* 1938 Supp. p. 58*) the incidence of these diseases has declined the following data are supplied —

Province	Hospital Cases		Dispensary Cases	
	Syphilis	Yaws	Syphilis	Yaws
Baganda	11,053	960	17 302	2,467
Eastern	6 026	3,850	8 587	5 704
Northern	1,504	12,306	1,967	15 143
Western	1,956	5 022	8,063	28,319
Totals	20,539	21,856	35 909	51 633

The distribution of gonorrhoea is not given, but it is stated that 14 789 cases were treated as against 16,236 in the preceding year. The results of treatment remain unsatisfactory owing to the irregular attendance of patients, but encouraging results followed the use of Uleron and M and B 693. The Laboratory Report observes that the Wassermann reaction was continued mainly to check the results of Kahn tests: the two methods applied to 327 specimens of sera gave absolute agreement in 81.9 per cent. relative agreement in 12.5 per cent. and absolute disagreement in 5.5 per cent. of cases. Total Kahn tests on sera numbered 21,355 and Wassermanns 1,304.

Other diseases referred to in the Report under review include 3,560 cases of trachoma, and 13,289 cases of other diseases of the eye and annexa. Affections of the skin and cellular tissue bones and organs of locomotion were responsible for 55 732 cases, a large proportion of patients in this group being treated for tropical ulcer. Cases of influenza reported totalled 28,514 and of these 10 770 were treated at hospitals and 17 744 at dispensaries.

Rheumatic conditions are a frequent cause of ill-health and during the year 22,559 patients were treated, while external causes accounted for 52,475 cases recorded at various treatment centres.

Scientific—The Laboratory Report supplies a brief account of the year's work and records that 53,028 specimens were dealt with: the principal specimens received have been the subject of mention in the preceding notes. Other Reports include those of the *Government Entomologist* and *Government Dental Surgeon*.

Scientific papers published by members of the Staff of the Medical Department include the following —

Hovvros (G. H. E.) Cotton and Plague in Uganda (with an appendix on post-mortem examinations of rats used in the experiments, by Dr R. S. F. HANWICK) — *Jl Hygiene* March 1938 Vol. 38

- GIBBINS (E. G.) Notes on Ethiopian Simuliidae—II *Ann. Trop. Med. & Parasit.* April, 1938 Vol. 32 p 21
- The Mouth Parts of the Female in *Simulium damnosum* Theobald, with special reference to the transmission of *Onchocerca voluulus* Leuckart.—*Ann. Trop. Med. & Parasit.* April, 1938 Vol. 32 p 9
- LOEWENTHAL (L. J. A.) Multiple Idiopathic Haemorrhagic Sarcoma of the penis.—*Arch. Dermatology & Syphilology* Vol. 37 p 972.
- WILLIAMS (A. W.) Heart Disease in the Native Population of Uganda Part I—Syphilitic Heart Disease.—*East African Med. Jour.* Vol. 15 p 279
- MITCHELL (J. P.) On the Causes of Obstructed Labour in Uganda.—*East African Med. Jour.* Vol. 15 p 177
- BROWN (A. F.) *Trypanosomiasis gambiensis* some observations in Uganda and their bearing on prophylaxis.—*Jl. Trop. Med. & Hyg.* 1938 June-Sept.

Financial—Total expenditure on Medical Services during 1938 amounted to £185 000 a sum which represents 9.9 per cent. of the total revenue of the Protectorate for the same year

TANGANYIKA TERRITORY (1938)

Tanganyika Territory consists of that part of former German East Africa which is administered under a Mandate by His Britannic Majesty. It lies between the Great African Lakes and the Indian Ocean, and adjoins Kenya and Uganda on the north, the Belgian Congo on the west, N. Rhodesia and Nyasaland on the south west and Portuguese East Africa on the south-east. The total area is about 365 000 sq. miles. Dar-es-Salaam is the capital and chief port, other important towns are Tanga, Tabora, Dodoma, Moshi and Arusha.

Vital Statistics—The estimated native population of the Territory was 5,217,345. No reliable vital statistics are available.

European Officials resident numbered 1 017 with an average number resident of 630 twelve were invalided and one died. Of *Asian Officials* 1,238 were resident with an average number resident of 904 nine were invalided.

The European Medical Staff during 1938 comprised a Director of Medical Services (Dr. R. R. SCOTT C.M.G.) a Deputy Director of Medical Services an Assistant Director of Medical Services 7 Senior Medical Officers and 39 Medical Officers (the latter including Specialists and Pathologists etc.) The *Asian Medical Staff* included an Assistant Surgeon 3 Senior Sub-Assistant Surgeons and 51 Sub-Assistant Surgeons.

Maternity and Child Welfare Work—This work continued to be carried on by Government and Missionary Societies at the 12 established Clinics (see this *Bulletin* 1939 Supp. p 59*). Of the 4,927 confinements dealt with, 3 786 were conducted at Mission Clinics. Other work recorded included mothers seen (new cases) 28,525 and children 43 432. A scheme of *domiciliary midwifery* worked by native midwives under the supervision of the Sleeping Sickness Officer and the European Health visitor was inaugurated at Tabora 43 confinements were attended. Ante- and post-natal clinics were also conducted. Four girls received a hospital course in Maternity and Child Welfare at the Tabora Medical School.

Leprosy—Better accommodation for lepers has been provided at all settlements from the special building grant which Government has been making for the past two years and the wattle and daub huts are gradually being replaced by brick houses. Dr Muir, of the British Empire Leprosy Relief Association visited each of the settlements as a result of his recommendations a Toc H worker is to be appointed to the Bunyon Leper Colony to introduce there vocational therapy. Detailed references to the activities of the Mission Leper Colonies testify to the admirable work which continues to be carried out at these institutions where 1 739 lepers were under treatment.

Critical Diseases—By comparison with 1937 experience (see this *Bulletin* 1939 Supp. p. 58*) the incidence of these diseases has declined the following data are supplied—

Province	Hospital Cases		Dispensary Cases	
	Syphilis	Yaws	Syphilis	Yaws
Naganda	11 658	969	17,302	2,467
Eastern	4,028	3,359	8,557	5 701
Northern	1 501	12,306	1,997	15 145
Western	1 928	5,022	8,083	25,319
Totals	20 576	21 856	25 969	51,633

The distribution of gonorrhoea is not given, but it is stated that 14 783 cases were treated as against 16,236 in the preceding year. The results of treatment remain unsatisfactory owing to the irregular attendance of patients, but encouraging results followed the use of Uleron and M and B 693. The Laboratory Report observes that the Wassermann reaction was continued mainly to check the results of Kahn tests the two methods applied to 327 specimens of sera gave absolute agreement in 81.9 per cent. relative agreement in 12.5 per cent. and absolute disagreement in 5.5 per cent. of cases. Total Kahn tests on sera numbered 21,355 and Wassermanna 1,304.

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Rheumatic conditions are a frequent cause of ill-health and during the year 22,559 patients were treated, while external causes accounted for 52,475 cases recorded at various treatment centres.

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Vital Statistics—The estimated native population of the Territory was 5,217,345. No reliable vital statistics are available.

European Officials resident numbered 1 017 with an average number resident of 630 twelve were invalided and one died. Of *Asian Officials* 1,238 were resident with an average number resident of 904 nine were invalided.

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General Diseases—By comparison with 1937 experience (*see Bulletin 1939* app p. 58*) the incidence of these diseases declined the following data are supplied —

Province	Hospital Cases		Dis
	Syphilis	Laws	Syphilis
Uganda	11 668	900	17,38
Eastern	6,020	3,650	8,60
Northern	1,504	12,308	1 00
Western	1 963	5 022	8 00
Totals	20,570	21,830	35 90

The distribution of gonorrhoea is not given but 14 783 cases were treated as against 16,230 in the previous results of treatment remain unsatisfactory owing to attendance of patients, but encouraging results follow Uron and M and B 693. The Laboratory Report the Wassermann reaction was continued mainly to of Kahn tests the two methods applied to 327 cases gave absolute agreement in 81.9 per cent, relative 12.5 per cent and absolute disagreement in 5.5 per cent. Total Kahn tests on sera numbered 21,355 and Wassermann 21,355.

Other diseases referred to in the Report under review cases of trachoma and 13,299 cases of other diseases under review. Affections of the skin and cellular tissue to locomotion were responsible for 55 732 cases, a large patients in this group being treated for tropical ulcer reported totalled 28,514 and of these 10 770 were treated and 17 744 at dispensaries.

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Scientific papers published by members of the Department include the following —

HOMER (G H E.) Cotton and Plague in Uganda on post-mortem examinations of rats used
Dr R S F HARRISON) — *J Hygiene* 31a

contains frequent references to the excellent work accomplished by the Missions. The volume of work dealt with during 1938 at various treatment centres can be summarized as follows —

Item	In patients			Out patients	
	Admitted	Treated	Died	Hospitals, etc.	Tribal Dispensaries
Europeans	1 655	1,877	20	3,282	—
Africans and Others	39,014	40 849	2,031	637,901	789,915
Totals	40 669	42,526	2,051	641 193	789,915
Treated by—					
African Dispensaries	1 075	1 125	35	160 298	
Missions	4,522	4,522	12	78 012	

Admissions to all *Mental Institutions* numbered 280 discharges 142 and deaths 61 at the end of the year there remained 237 patients under treatment.

The *training of African personnel* continues (see this *Bulletin* 1939 Supp. p. 62*) for in all branches of the Department's work the imperative need for this training becomes more and more obvious. Numbers of dispensers, tribal dressers, etc. passed out of the various Schools in the Territory and were posted to Stations; others were given refresher courses; others continued their studies and new pupils commenced work during the year. Recommendations have been made for the provision of additional schools at Moshi and at Tanga.

Other activities discussed in the Report under review include Dental Treatment and Radiography and Electro-Therapy.

With regard to *morbidity experience* during 1938 it is stated that the greatest numbers of general diseases treated were of the *Skin Cellular Tissue Bones and Organs of Locomotion* Group (106,585 cases), *Diseases of the Digestive System* (105,299 cases) and *Diseases of the Respiratory System* (80,271 cases).

During the year 55 636 cases of *malaria* were treated, the distribution of types of infection being *benign tertian* 211, *subtertian* 33 663, *quartan* 439 and unclassified 21,323. Of the total cases dealt with 876 occurred among Europeans. In-patient cases (all races) numbered 5 395 with 82 deaths; there were 535 European in-patients, no deaths. *Black-water fever* was responsible for 52 cases with 12 deaths; six cases and one death occurred among Europeans. *Anti-malarial* measures have been briefly mentioned under *Public Health* above. At the four Laboratories 15 648 blood films were examined for the presence of malaria parasites and positive findings recorded in 3 512 cases. A short report of the *Malaria Unit* Dar-es-Salaam presents detailed findings in anophelines dissected and seasonal variations in parasite index.

The atypical *smallpox* prevalent in the Southern Province continued throughout the year. 1 090 cases with 27 deaths were recorded and 155 410 vaccinations were performed. Elsewhere in the Territory 5 non-fatal cases were recorded. Cases of *cerebrospinal fever* (218 cases, 82 deaths) were reported from all provinces except the Southern. It is still thought that migrating labourers are responsible for the sporadic incidence. Three suspected cases of *plague* were reported from the

School Hygiene—The only reference speaks of the need for the organization of systematic medical inspection of school-children which becomes more and more obvious. The establishment of a School Dental Clinic at Tanga is recommended.

Public Health Sanitation etc.—The reorganization of the administration of the Department on provincial lines was carried a step further by the application of the system to part of the Southern Province (see this *Bulletin* 1935 Supp. p. 80*). A departmental pamphlet entitled *Memorandum on Government Policy* was widely issued to all concerned. The inauguration of systematic voluntary medical work under the auspices of the Order of St. John of Jerusalem is reported. Various classes for training were organized and by the end of the year 30 candidates had passed the examination in first aid. The systematic training of African personnel in various branches of medical and health work continues to absorb a large share of attention. Final reports on the work of the Malaria Units, Dar-es-Salaam and Moshi were published. Progress continued to be made with the anti-malarial drainage work at Dar-es-Salaam (see previous issues of this Supplement) and control is being maintained by entomological and parasitological methods to test the efficacy of the works in reducing anopheline infestation. Other works were undertaken at Moshi and in the vicinity of estates in the Northern Province, while preliminary surveys envisaging control works were also carried out in a number of other areas. With regard to sewage disposal it is noted that in the Eastern Province an intensive campaign was instituted for the construction of bore-hole latrines and that in Tanga Province the construction of the main sewage to Tanga was continued. Other matters referring to sanitation are contained in extracts from provincial reports. In the Dar-es-Salaam area the chlorination of the bore hole water supply was undertaken with satisfactory results. The bacteriological analyses of water samples are discussed at some length in the Laboratory section of the Report under review. The health of labourers on Estates received special attention. Continued efforts are being made for the improvement of housing and living conditions in labour camps. The subject of nutrition received close attention. An application was made to the Colonial Development Advisory Committee for financial assistance to enable the assembly of data about African nutrition, the programme of work being prepared in consultation with Dr B. S. PLATT who was appointed by the Medical Research Council to co-ordinate nutrition research in East Africa. Five Probationary Sanitary Inspectors received a year's training at Dar-es-Salaam and will continue their practical training at Tanga.

Port Health Work—Routine work continued along lines previously described. During the year 1975 steamers, 5 074 dhows, and 430 flying boats were given pratique at the 12 ports in the Territory.

Hospitals Dispensaries etc.—Additional facilities were constructed at native hospitals from the unclaimed balances of the former German Savings Bank, and other works on hospital buildings were carried out in five provinces from territorial funds. To meet a limited but definite demand a paying ward for native patients was instituted at Bukoba as an experiment. For Natives hospital beds total 2,246 accommodation for Asian patients is available at 16 hospitals, and for Europeans at 10 stations. There are 42 Medical Department Dispensaries and 285 Tribal Dispensaries in the Territory. Co-operation with Medical Missions was continued as usual. The Report under review

contains frequent references to the excellent work accomplished by the Missions. The volume of work dealt with during 1938 at various treatment centres can be summarized as follows —

Item	In patients			Out patients	
	Admitted	Treated	Died	Hospitals, etc.	Tribal Dispensaries
Europeans	1 655	1 677	20	3,292	—
Africans and Others	39 014	40 849	2,031	637 901	789 915
Totals	40 669	42,526	2,051	641 193	789 915
Treated by—					
African Dispensers	1 075	1 125	33	160,296	
Missions	4,522	4,522	12	78 012	

Admissions to all *Mental Institutions* numbered 280 discharges 142 and deaths 61 at the end of the year there remained 237 patients under treatment

The *training of African personnel* continues (see this *Bulletin* 1939 Supp. p. 62*) for in all branches of the Department's work the imperative need for this training becomes more and more obvious. Numbers of dispensers tribal dressers etc. passed out of the various Schools in the Territory and were posted to Stations others were given refresher courses others continued their studies and new pupils commenced work during the year. Recommendations have been made for the provision of additional schools at Moshu and at Tanga.

Other activities discussed in the Report under review include Dental Treatment and Radiography and Electro-Therapy.

With regard to *morbidity experiences* during 1938 it is stated that the greatest numbers of general diseases treated were of the *Skin Cellular Tissue Bones and Organs of Locomotion* Group (106,585 cases) *Diseases of the Digestive System* (105,299 cases) and *Diseases of the Respiratory System* (80,271 cases).

During the year 55 636 cases of *malaria* were treated the distribution of types of infection being *benign tertian* 211 *subtertian* 33 663 *quartan* 439 and unclassified 21,323. Of the total cases dealt with 876 occurred among Europeans. In-patient cases (all races) numbered 5 395 with 82 deaths there were 535 European in-patients no deaths. *Black water fever* was responsible for 52 cases with 12 deaths six cases and one death occurred among Europeans. *Anti malarial* measures have been briefly mentioned under *Public Health* above. At the four Laboratories 15 648 blood films were examined for the presence of malaria parasites and positive findings recorded in 3,512 cases. A short report of the *Malaria Unit* Dar-es-Salaam presents detailed findings in anophelines dissected and seasonal variations in parasite index.

The atypical *smallpox* prevalent in the Southern Province continued throughout the year 1 090 cases with 27 deaths were recorded and 155 410 vaccinations were performed. Elsewhere in the Territory 5 non fatal cases were recorded. Cases of *cerebrospinal fever* (218 cases 82 deaths) were reported from all provinces except the Southern. It is still thought that migrating labourers are responsible for the sporadic incidence. Three suspected cases of *plague* were reported from the

Northern Province at the main Laboratory Dar-es-Salaam, 2,909 rats were examined for the presence of *P. pestis* all were negative. African relapsing fever accounted for 1,644 cases and 13 deaths. The greatest number treated at a single hospital was 234 at Kigoma (Western Province) and the next highest relative numbers were at Tabora (Western Province) and Biharamulo (Lake Province). No case of yellow fever was recorded. The usual *Aedes* index Table is presented (see this Bulletin 1939 Supp. p. 64*)

One hundred and thirty-six cases of enteric fever with 35 deaths and 21 cases of paratyphoid fever with 4 deaths were reported. The centres of greatest incidence were Tanga (Tanga Province) 24 cases 11 deaths, Chania (Southern Highlands Province) 23 cases 10 deaths [The Provincial Report speaks of "35 known cases"] and Morogoro (Eastern Province) 22 cases, 3 deaths. Dysentery was responsible for 1,880 cases and 44 deaths of the total cases recorded 748 were amoebic, 173 bacillary and 964 were unclassified. Of the total cases recorded 656 were treated as inpatients 38 of these being Europeans.

The previous steady downward trend of trypanosomiasis received a check during 1938 when 409 new cases were reported and 353 deaths were ascribed to the disease of the total cases recorded 296 occurred in the Western Province (see this Bulletin 1939 Supp. pp. 64*-66*). The staff of agricultural surveyors working under the direction of the Sleeping Sickness Officer continued the consolidation of the concentration of population in fly-free clearings and assisted with anti-tsetse work. A brief résumé of the results of Dr. CONSON's research work at Tunde (referred to in previous issues of this Supplement) is presented. Dr. F. HAWKINS a Senior Research Fellow of the Medical Research Council carried out research into the efficacy of various drugs in the treatment of human trypanosomiasis.

Tuberculosis (all forms) accounted for 2,635 cases and 149 deaths 1,589 of the cases and 130 of the deaths were due to the pulmonary form of the disease. As regards provincial distribution of the disease the Northern Province shows the highest incidence with 793 pulmonary and 692 non-pulmonary cases, Tanga Province following with 291 pulmonary and 161 non-pulmonary cases. The final report on tuberculosis research in Tanganyika by Dr. WILCOCKS was referred to in the previous issue of this Supplement and was reviewed at length in the Bulletin of Hygiene 1938 Vol. 13 p. 628. At the four Laboratories 2,072 specimens of sputum were examined and 532 showed *Mycobacterium tuberculosis*.

Cases of helminthiasis treated, in order of recorded incidence, read taenians 23,725 ascariasis 23,283 ankylostomiasis 15,458 and schistosomiasis 4,258. In the Dar-es-Salaam district cooperation with a Mission in a local bookworm campaign was undertaken with successful results. Dr. A. Moxley Wandsworth Scholar of the London School of Hygiene and Tropical Medicine completed his biological study of the fresh water mollusca and their relation to human schistosomiasis. His conclusions incriminate *Biomphalaria (planorbis) pfeifferi* as the intermediate host of *S. mansoni* and probably *Physopsis globosa* as that of *S. haematobium*. Their distribution has been surveyed and methods of control examined. At the four Laboratories approximately 6,000 faecal specimens were examined and the following positive findings recorded—ova of ankylostomes 2,791 of *Ascaris* 125 of *Trichuris* 128 of *Taenia* 68 and of *S. mansoni* 19. Also upwards

of 3 000 specimens of urine were examined and the ova of *S. haematobium* were found in 839 specimens

According to the classified returns 189 cases of *leprosy* were treated during the year [According to the 1937 Report there were 31 leper settlements with about 3 400 inmates see this *Bulletin* 1939 Supp p 66*] Dr E Murr Medical Secretary of the British Empire Leprosy Relief Association visited most of the large leper settlements and furnished a valuable report since issued by the *Leprosy Review* Vol X. No 1 Jan 1939 It is hoped it may be possible to collaborate with territories adjoining Tanganyika and appoint a special officer for this work, a generous grant towards the cost having been offered by the British Empire Leprosy Relief Association At the Laboratories a total of 217 nasal smears and skin smears were examined *Mycobacterium leprae* was present in 76

Veneral diseases—Total cases of *syphilis* treated at Government institutions dispensaries and missions was 29 669 and of *yaws* 132,469 There were also recorded 11,845 cases of *gonorrhoea* and 1 461 cases of other *veneral diseases* The need for special measures against venereal disease in Bukoba is emphasized. At the main Laboratory Dar-es-Salaam 1,261 Wassermanns were carried out 565 gave positive and 64 doubtful reactions. At all Laboratories in the Territory 1 492 Kahn tests were performed with positive results in 525 and doubtful findings in 112 cases while among 763 urethral and vaginal smears examined it was found that gonococci were present in 170 cases.

Scientific—The Laboratory section of the Report under review discusses in detail the work of (1) the Main Laboratory Dar-es-Salaam of the three subordinate Laboratories and the Mobile Laboratory (2) Lymph production (3) The Chemical Unit (4) The Malaria Unit and (5) Special Investigations. The total number of specimens examined (exclusive of the routine specimens examined in the Malaria Unit) was 48,348 the principal of these and findings recorded have been the subject of brief mention in the preceding notes.

The Report includes a note on the history of the Dar-es-Salaam Laboratory and its association with Robert Koch and other distinguished workers and in view of the impending retirement of Dr J F Corson O.B.E. whose researches into Rhodesian Sleeping Sickness are of international repute presents a summary of results of his nine years of important work. The first number of a *Laboratory Bulletin* was issued in October 1938 it contains notes on new methods technique and recent literature likely to prove of service to workers remote from expert laboratory help

The mass of routine work made large scale research impossible, but it is noted that the work of the Government Analyst Mr W D RAYMOND on native medicines and arrow poisons was continued and is discussed in the Report under review

The list of *Scientific Publications by members of the Medical Department Staff* comprises upwards of twenty papers covering a wide range of subjects of medical interest It is regretted that limits of space prohibit the recapitulation in these pages of these valuable contributions to medical literature.

Financial—Actual expenditure on Medical Department Services amounted to £203 609 as against total estimated expenditure of £210 732. In addition sums totalling £6,986 were spent on Sleeping Sickness research and for anti-malarial works at Dar-es-Salaam for which purposes the Colonial Development Fund has provided £10 099

Public Health Sanitation etc.—Following a rapid survey of the country a Report on the Medical and Health Services and other matters of public health importance was prepared and submitted to Government by the newly arrived Director of Medical Services Dr H. DE BOER. The preventive side of medicine has so far received too little attention in the Protectorate there is no European Medical Officer in the service of the Government engaged primarily on the preventive side and only two European Health Inspectors. The problem of malaria prevention is a vast one and so far efforts have been limited to the area of townships. With regard to sewage disposal it is observed that no town in Nyasaland has a system of sewers a number of septic tank systems have been installed in Zomba and some other towns, but houses not so served use the bucket system and most of the native residential area has pit latrines. The need for the provision of water borne sanitation has been brought to the notice of Government. In the rural areas the Native Authorities have endeavoured to insist on the provision of pit latrines for native populations and most of these areas are satisfactorily served. The larger townships have piped water supplies though in some cases such supplies are limited to specific areas of a town and are sometimes liable to pollution (see this *Bulletin* 1933 Supp. p. 71⁹). Existing supplies appear to be inadequate and much work remains to be done to improve and protect supplies for the population as a whole. *Housing*—European, Asiatic, and African—is discussed at some length. Housing provided for African Civil Servants is reasonably satisfactory and in established villages Africans live in well-constructed dash and wattle huts, but lacking adequate lighting and ventilation in the majority of cases. Mention has been made of the yearly losses through the emigration of male adult labourers (see *1st Statistical Abstract* above) but it remains to say that numbers of Africans live and work on European estates in the Protectorate. The living conditions of these workers leave room for much improvement and these matters are receiving the attention of the Medical Department.

During the year a *Vaccination Survey* of certain areas was inaugurated under the direction of Dr B. S. PLATT an Officer seconded from the Medical Research Council, and a specially appointed staff of experts. The work of this team of investigators is described in some detail. Deficiency diseases are of common occurrence—much can be done to bring about improvement by means within the power of the African with the help of technical departments.

The training of *Sanitary Inspectors* is undertaken by the Health Inspector Zomba. A number of Africans are employed as sanitary inspectors at district stations and in rural areas as overseers of routine sanitary services etc. Among the *Recommendations for Future Work* it is stated that the most urgent need of the Department is a competent African staff but that the training of Africans for employment has not yet been put on a satisfactory basis (see this *Bulletin* 1933 Supp. p. 72⁹). Detailed schemes have been submitted to Government for the provision of the necessary training facilities.

Port Health Work—The Quarantine Camp at Port Herald on the Beira Nyasaland Railway functioned as usual. 2 Africans were detained having been in contact with infectious diseases or unable to produce the necessary certificate of vaccination. African labourers examined in transit through Port Herald numbered 974. The main airport of the country is at Chilika about 10 miles from Blantyre. Sanitary conditions at Chilika are maintained under the supervision

of the Medical Officer Blantyre. The Senior Medical Officer Lilongwe is in medical charge of the aerodrome at Lilongwe.

Hospitals Dispensaries etc—The Government maintains hospitals for Europeans at Blantyre and Zomba. The erection of a modern hospital to replace these was under consideration for some years and finally its provision was approved. It is recommended that this hospital should be erected in Blantyre as one of a group of hospitals catering for all sections of the population the group to be associated with the medical school for the training of African subordinate staff. A cottage hospital of four beds for Europeans is in course of construction at Lilongwe Northern Province.

In most Government African hospitals accommodation can be made available for the admission of Asiatics. There are 93 *Dispensaries* maintained by the Department and staffed with African dressers trained locally. It is said these dispensaries have not been an unqualified success—yet there is a persistent demand from Native Authorities for dispensaries in areas where such treatment centres have not been provided (see this *Bulletin* 1939 Supp. p. 73*).

At all hospitals 240 Europeans and 11,850 Africans and Asiatics were treated as *in-patients* of the 288 deaths only 3 occurred among Europeans. Hospital *out-patients* numbered 133,861 (1,645 Europeans) and non-Europeans treated at Dispensaries 332,278.

Mission Hospitals—A small hospital for Europeans is maintained at Malamulo in the Cholo District by the *Seventh Day Adventist Mission*. The *Church of Scotland Mission* at Blantyre have special accommodation for sick Asiatics.

Tabulated returns of diseases are presented in the Report under review. The accuracy of the figures cannot be vouched for especially under the heading of *Out patients* many of whom are treated by poorly trained African subordinates.

To what degree *malaria* is the cause of ill health among the general population is difficult to determine, for in some areas the health picture is complicated by helminthic infections, in others by defective nutrition. That the disease is responsible for considerable disability is indicated by the fact that 54 per cent. of all patients admitted to the Zomba Native Hospital harboured malaria parasites. *subtertian* infections predominate. One hospital death among Europeans and 16 among Africans and others were recorded.

The common vectors are *A. gambiae* and *A. funestus* but during the colder months *A. rhodesiensis* is frequently found in houses. The Medical Entomologist describes the investigations undertaken in an attempt to determine the infectibility of *A. rhodesiensis* with malaria parasites. At the Government laboratory Zomba 4,390 blood films were examined for the presence of malaria parasites and 1,214 gave positive findings. Among the findings *P. falciparum* occurred in 967 specimens *P. malariae* in 178 and *P. vivax* in 4.

The outbreak of *cerebrospinal meningitis* reported in 1937 rapidly lost its epidemic character in 1938. Hospital returns show one fatal European case and 77 African and Asiatic cases with 24 deaths. At the Laboratory 34 specimens of cerebrospinal fluid were examined 9 proving positive for meningococci.

It is said that cases of *relapsing fever* were recorded at practically every district hospital the diagnosis being confirmed in each case by microscopic examination. One European out patient case was notified. Among Africans and Asiatics there were 129 in patient cases.

ZANZIBAR (1938).

of tuberculosis by *Mycobacterium tuberculosis*, the possibility of *M. tuberculosis* transmitting *Mycobacterium leprae* and whether a common day-biting culicid can ingest *Mycobacterium leprae*. Other special studies dealt with the transmission of malaria by *Anopheles gambiae* trial of a new treatment for malaria, observation on *Anopheles* fed on a case of blackwater fever, observations on *Ornithodoros* and Relapsing fever and a scheme devised for the control of rats. Several of these special studies have been the subject of brief reference in preceding sections of this Summary. The following paper was published by Dr Lamborn —

LAMBORN (W. A. S.) Some Features in the Life History of Tabanidae in Nyasaland—*E. Africa Med Jour* 1938. May

Financial.—Total expenditure on Medical Department services for 1938 amounted to £32,839 a sum which represents 6.1 per cent. of the total revenue or 6.4 per cent. of the total expenditure of the Protectorate for the same year.

ZANZIBAR PROTECTORATE (1938).

Zanzibar Protectorate off the East African Coast comprises the islands of Zanzibar and Pemba and the islets within their territorial waters. Zanzibar is about 53 miles long by 24 miles broad with an area of 840 sq miles. Pemba, to the north-east of Zanzibar is about 42 miles long by 14 miles broad. The only town of importance is Zanzibar Town.

Local Statistics.—The relevant facts are as follows —

Estimated population	Births	Birth Rate	Deaths	Death Rate
241,496	3,441	14.1	5,040	20.9

It will be noted that in 1938 there was a considerable excess of deaths over births registered. On the other hand registered facts are unreliable and in the words of the Report "it is questionable if it is worth recording them." The Infant Mortality Rate is stated to be probably more than 275 per 1,000 live births.

European Officials resident numbered 103 with an average number resident of 80. No invalidings or deaths were recorded. Of Non-European Officials 513 were resident with an average number resident of 467. Four were invalided and four died. Two European Non-Officials died during the year and 168 were treated for various ailments at Government Hospitals.

According to the Sanctioned Establishment the Medical Staff comprised the Director of Medical Services (Dr W. LESLIE WARR), eleven European Medical Officers and one Dental Surgeon, seven Sub-Assistant Surgeons, and two Senior Native Medical Assistants.

Maternity and Child Welfare Work.—The appointment of a second woman Medical Officer marked the determination of Government to pursue the policy of separate provision for women and children, a policy which has proved so conspicuously successful (see this Bulletin 1936, Supp. p. 81* and 1939 Supp. p. 77*). It is proposed to provide

in the Island of Pemba services comparable with those obtainable in Zanzibar. The extension of these services to the rural areas has also proved most popular. Women and children who would never be seen by men Medical Officers are attending in increasing numbers. The extended use of nursing sisters in these developments affords the most helpful and economical methods of reaching and influencing the peasant population of the Protectorate.

Total attendances at Clinics of women and children in Zanzibar during 1938 declined when first opened the Clinic was attended by many women out of curiosity but also it is to be noted that during the year the first woman Medical Officer (to whom women and children had grown accustomed) went on leave and her relief did not arrive to continue the work for some weeks. New cases numbered 5,245 and 38,039 attendances were recorded. At the *Ante-Natal Clinic* there were 109 new cases and 784 repetitions. Of the new cases 36 women were delivered in hospital. Other work may be summarized as follows —

Clinic	New Cases	Attendances
Infant Welfare	?	2,908
V.D.	?	1,140
Ankylostomiasis	?	1,064
Diabetic	?	8 diabetics attend twice weekly
<i>Rural Dispensaries —</i>		
Mkokotoni	1,011	2,653
Solem	440	1,829
Mwera	398	1,448
Ziwani Police Lines	Opened late in the year results, so far are not encouraging	

Fertility and Infant Mortality Rates are difficult to ascertain with any degree of accuracy. The following data relate to 3 groups of 100 families each selected at random in Zanzibar and 100 of mixed race at each of the three rural dispensaries —

Item	Zanzibar			Rural Dispensaries		
	Arabs	Africans	Indians	Mkokotoni	Solem	Mwera
Number of families	100	100	100	100	100	100
pregnancies	208	193	341	172	283	241
Live births recorded	156	143	271	130	183	176
Deaths { Neo-natal	15	16	7	11	6	7
Under 1 year	14	14	13	17	38	33
Over 2 years	9	27	15	19	34	20
Stillbirths	16	19	23	20	14	19
Miscarriages	36	31	47	22	66	46

School Hygiene — The systematic examination of school-children by Medical Officers and Dentist was continued. Small improvements in hygiene standards suggest that these services are slowly but surely proving effective. In Zanzibar rural schools 631 pupils were examined and 187 in Pemba schools. The results of these examinations are set

out in detail in the Report, but the following notes summarize the principal findings —

Nutrition — Fairly marked improvement considerably fewer cases of gross nutritional deficiencies were recorded from Pemba rural schools than from Zanzibar (see this *Bulletin* 1939 Supp. p. 78*). Towards the end of the year the policy for providing free meals for the children of a limited number of schools was adopted by Government. In the majority of schools the cleanliness of the pupils showed improvement but in some schools parasitic skin diseases were extremely prevalent.

The *Dental Surgeon* visited every school in the Protectorate. In Zanzibar rural schools 31 per cent. of the pupils required dental treatment. Examination of stools and urine for *helminthic infestations* were carried out only in the schools in the south of Zanzibar Island and in Pemba. In Zanzibar schools 27 per cent. of the children were infected with *hookworm* and 58 per cent. with *Ascaris*, and in Pemba 65 per cent. with *hookworm* and 33.5 per cent. with other worms. A *spleen rate* of 39 per cent. was recorded for children attending Zanzibar rural schools, the corresponding rate in Pemba being 58 per cent. Examinations of blood films for *malaria parasites* were carried out in all Pemba schools and in three schools in the south of Zanzibar Island. In Pemba the parasite rate was 51 per cent. and in the three Zanzibar schools 12 per cent.

Lectures and demonstrations were given regularly in rural schools by Sanitary Inspectors. Hygiene is included in the curriculum of all schools.

Public Health Sanitation etc. — *Anti-malarial measures* have practically eliminated the breeding of anophelines in Zanzibar Town, but the insects continue to enter from the zone lying immediately outside the town boundaries. In these circumstances control measures were extended and special attention was devoted to this zone. In Pemba measures taken have resulted in a very considerable decrease in anopheline breeding areas.

With regard to *sewage disposal* in Zanzibar "Stone Town" 84 new septic tanks were installed. During the year a start was made in rural areas to provide pit latrines for all huts or family groups. By the end of the year 2,705 had been dug.

If *water supplies* in Zanzibar town were satisfactory. In Wele heavy rains caused contamination of supplies. Constructional improvements were carried out to the catchment area. The Chake Chake supply is always chlorinated. The Mkoani supply is not satisfactory (see this *Bulletin* 1939 Supp. p. 79*).

Housing conditions have changed little in Zanzibar "Stone Town" (see this *Bulletin* 1937 Supp. p. 72*) but in the Native Town improvements are gradually being effected by the re-alignment or re-siting etc. of huts. In Pemba township also efforts are directed towards the improvement of housing conditions by layouts in new hutting areas. Rural housing conditions are said to be reasonably good for the usual Swahili rural hut is well built cool, and well ventilated (see also this *Bulletin* 1939 Supp. p. 79*).

Brief reference has already been made to the increased attention being devoted to the study of *nutritional problems* in the Protectorate (see *School Hygiene* above). With regard to the native population at large the outstanding vitamin deficiency clinically demonstrable is that of Vitamin A. Foodstuffs containing this vitamin are grown

locally but presumably they are either consumed in insufficient quantities or their method of preparation is at fault (see this *Bulletin* 1938 Supp p 83* and 1939 Supp p 79*). Trial of popularity has been made by issuing quantities of *red palm oil* (rich in Vitamin A) free to eating house keepers. The Agricultural Department are experimenting with the local growth of the palm and to the general improvement of locally grown foodstuffs. The *milk supply* of Zanzibar Town received special consideration the question of installing a pasteurization plant was reviewed but ultimately abandoned on grounds of expense.

The seven district *Sanitary Inspectors* in Zanzibar and the two in Pemba carried out their difficult and responsible duties very efficiently. During the year three African rural Sanitary Inspectors were employed were posted to adjoining districts and were engaged chiefly on anti-hookworm measures. At first the activities of these men were viewed with some suspicion but their popularity is increasing. Dr W Leslie Webb again refers to the importance of *training native personnel* (see this *Bulletin* 1939 Supp p 79*). The Medical Officer of Health has undertaken the *training of Sanitary Inspectors*.

Port Health Work—During the year 622 ships and 2 656 dhows visited Zanzibar 17 076 immigrants landed and 16,895 emigrants left. All immigrants—except those showing recent scars—are vaccinated 3,327 such vaccinations were performed. *Aerial traffic* accounted for the arrival and departure of 338 aeroplanes 294 immigrants landed and 219 emigrants left by aeroplane.

Hospitals Dispensaries etc—The various institutions maintained by Government in Zanzibar and Pemba are 12 hospitals, 26 dispensaries 3 special clinics and 2 leper colonies.

In-patients treated numbered 5 615 and of these 5 099 were admitted during the year. European in-patients numbered 104. Hospital deaths totalled 531. New cases among out patients numbered 116 262 attendances for treatment at various centres totalled 406 639.

Special consideration was devoted during the year to a scheme for the *training of native personnel*. The scheme aims at replacing existing and insufficiently trained native orderlies *ayaha* etc. by a body of employees fully trained over a period of three years or more. The inauguration of the scheme would demand considerable capital expenditure and endeavours are being made to give effect to the more important of the proposals having due regard to the financial limitations of the Protectorate. In the meantime such training of native personnel as circumstances permit has already commenced (see *Public Health* above). Also during the year five girls and five boys of the requisite standard of education were employed at the hospital and afforded such vocational training as the existing organization permits.

The notes which follow briefly summarize the references in the Report to the principal diseases treated at Government Hospitals and dispensaries during the year.

Malaria patients dealt with at treatment centres totalled 8,877 and of these 327 were treated as in-patients with 7 deaths. The distribution of types of infection among all cases reads *benign tertian* 619 *subtertian* 1 788 *quartan* 28 unclassified 6 432 and *blackwater fever* 10 the corresponding figures for in-patients only being 45 138 0 140 and 4 respectively. Among 9,235 blood films examined at the Laboratory for the presence of malaria parasites 2 040 gave positive findings types of infection are not differentiated.

Of enteric fever 20 cases were notified 19 of these in Zanzibar Town 10 of the cases were treated in hospitals. Each case notified was investigated and in one instance a carrier was found to have been responsible for seven cases. At the Laboratory 20 out of 57 samples of serum agglutinated *Bact. typhosum* 13 out of 2,176 faecal specimens were positive with *Bact. typhosum*. Notified cases of dysentery numbered 36 Hospital Returns show that 111 persons were treated for this cause the types of infection being amoebic 2, bacillary 69 and 40 unclassified cases. Among 236 faecal specimens bacteriologically examined *Bact. dysenteriae* Flexner was isolated in 32 and Sonne in 7.

Tuberculosis was responsible for 115 new cases being seen, but Hospital Returns show that 364 patients were treated, 333 of these suffering from the pulmonary form of the disease. It is said that many of the cases of the disease are neither notified nor under treatment though encountered by the Medical Officer of Health and Sanitary Inspectors on their rounds. At the Walezo Tuberculosis Asylum 61 patients were admitted 32 died, and at the end of the year there remained 18 under treatment. At the Laboratory 570 specimens of sputum were examined and 169 were positive with *Myco. tuberculosis*.

Other respiratory ailments included pneumonia (all forms) 585 with 80 deaths, bronchitis 4,385 cases, 2 deaths.

Leprosy.—Ten patients were admitted to the Walezo Leper Settlement during the year and there remained 54 lepers under treatment at the end of the year. To the Makondeni (Pemba) Settlement 12 patients were admitted and there remained 62 under treatment at the end of the year.

Helminthic Diseases.—Hospital Returns record 11,340 cases of ankylostomiasis 431 of schistosomiasis and 260 of other helminthic diseases. The provision of a sum of £800 in the estimates for 1938 allowed for a considerable extension of the pit latrine programme by the end of the year some 3,000 latrines had been dug and over 700 were in use. Three African Sanitary Inspectors were in charge of this work touring their areas and addressing the people on the subject of hookworm. Few were interested and a few were actively hostile to the new proposals. By reason of these and other difficulties the 1938 experiment was only a qualified success but it has paved the way for future effort.

With regard to schistosomiasis the investigations of Dr A. Moxley of the London School of Hygiene and Tropical Medicine resulted in the formulation of measures designed to eradicate the disease. The following findings were recorded at the Laboratory. Faecal specimens examined 5,144. Positive findings: *Ancylostoma* 2,244. *Ascaris* 202. *Trichuris* 323. *Strongyloides* 201. Others 6. Urines examined 541. *S. haematobium* found in 91.

Enteric Diseases.—The following data are taken from classified Returns —

Item	In- and Out patients	Kahn Tests	
		No.	Positive
Typhus	907	2,844	1,011
Gonorrhoea	1,206	—	—
Other V.D.	72	—	—

Gonorrhoea is said to remain as widespread as ever. A few cases have been treated with *uleron* with encouraging results. At the Laboratory among 661 smears examined 314 were positive with *N. gonorrhoeae*.

Other diseases referred to in the Report under review and calling for brief mention in this Summary include the following —

(a) *Diabetes* is not infrequent in Zanzibar (113 cases recorded) and is an unsatisfactory disease to treat as the diet of the people is so largely made up of carbohydrates. With one exception (a Hindu) all cases so far treated at the diabetic clinic have been Mohammedans. The Report adds. One point of social interest is the method by which the more primitive classes recognize the disease. They notice when they urinate in the open that ants collect at once at that place.

(b) *Cancer*—Hospital Returns show that 53 patients were treated for malignant and 193 for non malignant tumours and that out of 34 specimens histologically examined at the Laboratory 8 were carcinomas and 3 sarcomas.

(c) *Diseases of the eye* are a serious cause of disability. During the year 3 557 patients were treated and among these were 140 cases of *trachoma*. *Trachoma* is said to be rare amongst Africans but usual amongst Muscat and Hadramaut Arabs living in Zanzibar. At the *Clinic for Eye Diseases* some 1,500 new cases were seen during the year.

(d) *Avitaminosis* is very common the main sufferers appearing to be people living in the villages. The Report observes. Those admitted to hospitals practically all show evidence of Vitamin B deficiency in the form of polyneuritis.

Often the initial symptom the patient complains of is inability to pick things up. Some cases show a positive Kahn and in such patients intensive intravenous therapy helps the recovery period considerably. On the other hand the treatment of other intercurrent infections as malaria and hookworm does not seem to have any effect on the progress of the polyneuritis.

(e) *Duodenal ulcer* is comparatively frequent in Zanzibar and no age after the 20th year seems exempt. The question of hookworm infestation as a contributory factor is discussed. Some cases of ankylostomiasis showed a hyperacidity highly suggestive of duodenal ulcer but the numbers were too few to justify dependable conclusions. The subject is worthy of further investigation.

The following paper was published during the year —

VASSALLO (S. M.) Acute Fungulitis in Zanzibar — *East African Med Jour* Vol. 15 No. 9

Financial—Total expenditure on Medical Department Services amounted to £47,543 a sum which represents 10.4 per cent. of the total revenue of the Protectorate during the year under review.

SOMALILAND PROTECTORATE (1938)

Somaliland occupies the North-eastern horn of the African continent, jutting into the Indian Ocean on the south of the Gulf of Aden. The boundaries have been settled by agreements with France, Italy and Abyssinia. The chief ports are Berbera, Bulhar and Zailah, and its area about 68 000 sq. miles, or one-sixth larger than England and Wales together.

Vital Statistics—The only population figures quoted are those available from the 1931 census reading as follows — Europeans and

Whites 68 Natives (Somalis) 344,700 Arabs 614 Other natives of Africa 438 Others 543. The experiment tried out in 1937 seeking to obtain tribal returns of births and deaths was discontinued, as the data received were hopelessly incomplete and inaccurate (see this *Bulletin* 1939 Supp. p. 83*).

European Officials resident numbered 66 with an average number resident of 41. No invalidings or deaths were recorded. Of Asiatic Officials there were 94 resident with an average number resident of 70 within this group one invaliding and one death were recorded.

The Medical Staff of the Protectorate comprises Dr P. S. Bell, Senior Medical Officer 4 European Medical Officers, 3 non-European Assistant Surgeons and 3 Sub-Assistant Surgeons.

The data relating to Troops and Police read as follows —

Item	Total Strength	Average Strength	Invalidings	Deaths
Troops (K. A. R.)	60*	448	12	8
Police	653	623	13	4

Maternity and Child Welfare Work—A scheme was prepared envisaging the establishment of two Maternity and Child Welfare Centres for Burao and Hargeisa respectively staffed by 3 European Nursing Sisters (one at each Centre and one on leave to provide for continuity of the work). At each centre two trained midwives would assist the European Nursing Sisters and arrangements would be made for the training of native midwives. Enquiries among native women were made with a view to discovering whether the women would willingly make use of these services if provided. On the whole replies were favourable but the general impression gained was that at first the centres would attract only urban dwellers particularly the wives of Government employees. The proposals rested at this stage at the end of the year.

School Hygiene—The Government School in Berbera was opened in December. A daily sick parade is held and it is intended that the routine medical examination of the children shall be instituted in January 1939 (see this *Bulletin* 1938 Supp., p. 87*).

Public Health Sanitation etc (see also this *Bulletin* 1939 Supp., pp. 83-84). The methods taken for malaria control remained unchanged. In townships a weekly "dry hour" is held during which all water-taps are turned off, receptacles must be dry and a search for collections of standing water is made where such collections are unavoidable these are oiled. The free distribution of quinine continues.

As regards general measures of sanitation it is stated that the accumulation of years of deposited rubbish on the outskirts of Berbera were cleared and the area rendered more salubrious, though it is added "by the end of the year conditions were beginning to revert to their former state. Additional latrine pits were constructed at Burao, Hargeisa, and Borama, and refuse bins were distributed in Berbera and Hargeisa. No mention of water supplies appears in the Report under review. The Standing Committee on *Housing and Town Planning* in Berbera met several times but no information is supplied of the results of these meetings. The Standing Committee on *Human Nutrition* considered among other matters methods of milk distribution which would make surplus camel milk up-country available for coastal areas provision

is to be made in the 1939 Estimates for the purchase of suitable milk containers for use in connexion with the milk distribution scheme. The Committee could find no justification for the establishment of a *Nutritional Research Laboratory* since the chief need is for field survey work embracing within that term studies of the diets of both rural and urban peoples. It was considered that field investigations should be carried out by individual members of the Medical Veterinary and Agricultural Departments.

Training of Sanitary Personnel—A scheme for the formation of a Sanitation Sub-Section of the Medical Department was submitted to the Secretary of State for the Colonies and approved. At the head of this work will be a European Sanitary Superintendent with extensive African experience. One of his principal duties will be the training of Native Sanitary Inspectors. It is hoped to start this scheme in 1940.

Recommendations for future work include provision of a system of latrines and effective methods of disposal of nightsoil in Berbera.

Port Health Work—No information supplied.

Hospitals Dispensaries etc—Alterations and new constructions were carried out during the year at a number of hospitals. Hospital returns show that 2 783 patients were admitted, 2,946 were treated, and 104 hospital deaths were recorded. Out patients numbered 46 423 (the latter figure totals 46 273 on p. 30 of the Report).

The numbers of out patients continue to decrease. The causes of decline were discussed by Dr Bell in the 1937 Report and he adheres to the opinions then expressed (see this *Bulletin* 1939 Supp. pp. 84*-85*). The figures for both in and out patients at the Ethiopian Refugee Camp at Manjaseh show considerable increases but it must be remembered they relate to a complete year whereas the corresponding figures in 1937 covered the period August-December only.

With regard to subordinate staff it is stated that a new grade of Dispensary Probationer has been introduced and that two men are being trained at Berbera as Probationer Field Dressers. When qualified these men will spend their time in the field moving from village to village treating cases brought to them.

An epidemic of malaria of moderate severity occurred in the autumn. Its main effects were felt at Manjaseh (where it is said 881 cases occurred) and also in the Hargeisa and Borama Districts. The Medical Officer Hargeisa, observes, as regards the cases in this hospital 35 per cent. came from Italian territory. In one section of the Report it is stated that 972 cases of malaria were treated in the Protectorate and 881 cases at the Manjaseh Camp Hospital (a total of 1 953 cases) but the classified returns which summarize the recorded facts for all hospitals make mention of 647 in patients (636 admissions during 1938) and 1,306 out patients or a total of 1,956 cases. Among these cases the distribution of types of infection was as follows—

Infection	In-patients	Deaths	Out patients	Total Cases
Benign tertian	143	1	348	489
Quartan	15	2	12	27
Subtertian	429	3	358	785
Cachexia	14	1	17	31
Unspecified	46	0	578	624
Totals	647	7	1,306	1 956

RHODESIA.

NORTHERN RHODESIA (1939)

Northern Rhodesia lies north of the Zambesi River with Tanganyika Territory and the Belgian Congo to the north, Nyasaland and Portuguese East Africa on the east, Southern Rhodesia and South-West Africa on the south and Portuguese West Africa on the west. The area of the Territory is estimated at about 237 860 sq miles and divided for administrative purposes into nine Provinces.

Vital Statistics.—In each Annual Report in recent years Dr HASLAM, Director of Medical Services, has called attention to the fact that no system obtains in Northern Rhodesia for the assembly of reliable population data (see previous issues of this Supplement). In the Report under review he again deplors the lack of vital statistics, observing "The European population is guessed at 13 155 the African population at 1,377,859 goes on to speak of the "incalculable" mortality figure for Africans, and adds "to so great an extent does Northern Rhodesia's prosperity depend upon African labour and to so great an extent is the Protectorate's labour being sought by neighbouring countries that it seems to me to be of the highest importance that we should know beyond any doubt, whether the African population is increasing stationary or decreasing."

European deaths totalled 129 and of these 10 were *infant deaths* as there were registered 355 European births the European *infant mortality* rate would be 28.2 per 1 000 births (see this *Bulletin* 1939 Supp. p 88*).

European Officials resident numbered 687 with an average number resident of 506 one death was recorded. There were 3 048 *Natives Officials* resident with an average number resident of 2,984. Within this group 13 deaths and 44 invalidings were recorded.

The Authorized Establishment of *Medical Staff* provides for a Director of Medical Services (Dr J F C Haslam), a Deputy Director of Medical Services and 20 European Medical Officers.

Sisterhood and Child Welfare Work—At European Hospitals 212 women were treated for diseases of pregnancy etc. and at Native Hospitals 159 cases were dealt with.

The four established *Welfare Clinics* continued to function successfully (see this *Bulletin* 1937 Supp. p 79*) and a start with welfare work was made at Broken Hill. At the *European Welfare Clinics* 863 cases and 5,914 attendances were recorded, the corresponding figures for *Native Welfare Clinics* were 29,339 and 152,762 respectively.

Three new *Nursing Sisters* were appointed for service with the *Welfare Clinics*. The increase in welfare clinics in the copper belt has not yet eventuated owing to delay in the erection of necessary premises but it is hoped these will be completed in 1939 (see this *Bulletin* 1939 Supp. p 88*).

School Hygiene—The examination of all European school-children was carried out by Dr G M C POWELL who contributes a separate report describing the results of his work. Briefly it may be stated that of the 1,223 children on the registers 1 108 were examined and the state of nutrition of each estimated. The final results classified 29.2 per cent as excellent 29.7 per cent as good (normal) 13.9 per cent as fair and 27.1 per cent as poor. The settled areas of the country show a high incidence of sub-nutrition, a high spleen index,

and a great deal of anaemia the nutrition of children in the Lusaka area was found to be definitely worse than in any other area.

Instruction in hygiene continues to be given in all schools and special emphasis is devoted to hygiene during the courses of the training of prospective teachers at the Jeanes School.

Public Health Sanitation etc—Financial conditions permitted the increase of the establishment of Medical Officers by two and Nursing Sisters by five. The reports from all Medical Stations indicate that full use of available resources is made: no heavy or unusual mortality or morbidity was reported during the year. The main anti-malaria work at Lusaka was consolidated but no extension of works was possible. The survey of the Livingstone area necessary before operations can be undertaken was completed towards the end of the year (see this *Bulletin* 1939 Supp p 89*). Continuous efforts are made in all areas to control malaria but District Reports refer to the need for skilled supervision of all routine anti-malaria activities.

With regard to *sewage disposal* though the bucket system continues to be the main method in use at European quarters there is a steady increase in the numbers of septic tank installations. For Native quarters there is a welcome tendency towards the adoption of deep pit latrines.

Piped water supplies are rare in Northern Rhodesia and the only areas having such supplies appear to be Livingstone, Lusaka, Broken Hill, Ndola, Luanshya, Kitwe and Mufulira. Other supplies are mostly primitive shallow wells, rivers and streams etc. and in many native areas there is a definite water shortage. On the larger European properties bore-holes of varying depth provided with wind mills are to be found.

Organized recruiting of labour for employment outside Northern Rhodesia again increased (see this *Bulletin* 1939 Supp p 89*). The conditions under which labour is employed by the Copper Mining Companies continue to be very satisfactory: these concerns realize the value of their labour and regard good treatment as a sound financial policy. Experiments are in progress at Nkana (Rhokana Corporation) with a view to discovering the most satisfactory scale of rations etc. Labourers of the Zambesi Saw Mills live and work under conditions less satisfactory than those in the mining industry: conditions of agricultural labourers are not satisfactory and endeavours are to be made to bring about necessary improvements (see this *Bulletin* 1939 Supp p 89*).

Though improvements in housing conditions in large and small towns are reported there is still much room for further progress to be made. The Medical Department prepared for distribution suggestive notes for the betterment of housing conditions in urban and rural areas.

The measures for the inspection and control of food in the principal centres of European population continued to be applied. Milk is nowhere to be regarded as safe without boiling or pasteurization. While frank deficiency diseases are not frequently encountered qualitative food deficiencies are probably widespread.

The training of Health Department personnel was continued at the training school Lusaka.

Port Health Work—No change is reported in arrangements for dealing with work at the only port in the Protectorate on Lake Tanganyika (see this *Bulletin* 1937 Supp p 81*). As regards *aerial traffic* the aerodromes are (a) Mpika for machines from Kenya

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and Tanganyika (b) Broken Hill for services from the Congo to Madagascar (c) Lusaka for machines from Salisbury and (d) Livingstone (in wet weather Lusaka) for machines from Bulawayo. With the exception of Mpika all conform to the requirements of a "sanitary aerodrome".

Hospitals Dispensaries etc—No additional hospitals were built but new hospitals to replace existing native hospitals at Abercorn and Fort Jameson are in course of construction. During 1938 Government maintained 7 European hospitals, 12 Native hospitals and a number of Rural Dispensaries.

Mission Medical work continued to be carried out successfully in a large number of areas the Report under review presents data relating to nearly 40 Mission treatment centres.

The Mining Companies continued to maintain admirably staffed and equipped hospitals for European and Native employees and their dependants.

In 7 European Hospitals maintained by Government 2 055 in-patients were treated and 37 died. In 12 Native hospitals 12 271 in-patients were treated, 448 died, and there were 44 420 out-patients. Returns from 23 Dispensaries show that 35 167 patients were dealt with. To hospitals maintained by Mining Companies 11 032 patients were admitted and 231 died and at 38 Mission Centres 6 848 in-patients and 108 640 out patients were treated.

Among Europeans, malaria continues to be the chief cause of invaliding and an important cause of death. During the year under review the numbers of cases of malaria and blackwater fever were the highest recorded for many years. The following figures relate to the numbers treated in European and Native hospitals showing the type of infections in these groups.

Type of infection	Europeans			Natives		
	Admitted	Treated	Deaths	Admitted	Treated	Deaths
Benign Tertian	—	—	—	5	5	—
Quartan	—	—	—	1	1	—
Subtertian	280	281	—	886	600	20
Unclassified	22	366	5	342	362	1
Blackwater Fever	22	23	5	3	3	2

The Medical Officer Broken Hill reported 11 non-fatal cases of blackwater fever making 16 successive cases without any death. This excellent record he attributes to prompt treatment by *atobrin* given intramuscularly.

There were two small outbreaks of *smallpox* both in Barotseland. 37 native cases with 4 deaths were recorded, together with 22 non fatal cases of *alexirim*. It was clearly established that the disease was introduced from neighbouring Portuguese territory. *Cerebrospinal fever* was responsible for 3 European hospital cases with one death and 25 cases among Natives with 18 deaths, but there were notified 60 native cases with 23 deaths. There were 4 European and 107 Native cases notified of *relapsing fever* with four deaths among natives. The suggestion is made that in Northern Rhodesia the disease may be other than tick-borne. The Medical Officer Mazabuka, saw 4 cases among native prisoners but search failed to disclose ticks at the gaol.

though prisoners blankets were louse-infected (see this *Bulletin* 1939 Supp. p. 92*)

Cases of *sleeping sickness* numbered 94 with 11 deaths all occurred among natives. About a quarter of the cases occurred in the Abercorn district near the shore of Lake Tanganyika and almost entirely from the village of Mbete where *G. palpalis* has a favourite haunt and breeding-ground in the so-called 'sacred forest'. Destruction of this forest which is the traditional burial place of the tribal chiefs would be easy and effective but would gravely offend native sentiment. During 1939 the Mbete people will probably be moved to a safe area and entry to the 'sacred forest' prohibited to all save the hereditary keepers of the graves.

Notified cases of *typhoid fever* were Europeans 7 Natives 40 with 4 deaths there were in addition 6 cases of paratyphoid among Europeans. A small outbreak (16 cases, 2 deaths) was reported among natives at Nchanga mine where sanitary conditions during the construction stage were not satisfactory. As regards *dysentery* during 1938 the following statement summarizes the available facts —

Type of infection	Europeans				Natives			
	Cases Notified	Deaths	Hospital Cases	Hospital Deaths	Cases Notified	Deaths	Hospital Cases	Hospital Deaths
Amoebic	19	—	11	—	102	—	67	1
Bacillary	19	—	2	—	25	4	19	3
Undefined	6	1	6	1	93	6	9	1

Tuberculosis among Northern Rhodesian natives continues to be a cause of anxiety total notifications during the year were Europeans 7 of which 6 were due to the *pulmonary* form of the disease and Natives 234 and of the latter 187 were pulmonary and the cause of 25 deaths. The sudden increase in the 1938 figures led to enquiry when it was found that 124 of the total notifications came from Mufuhra and that all rested on diagnosis by microscope. Dr J. F. C. HASLAM, Director of Medical Services discussed the situation in detail with the Chief Medical Officer of Mufuhra Copper Mines Ltd. when all case records etc. were carefully examined. The Report continues 'Investigations are not yet complete but it appears that a non pathogenic bacillus both acid fast and alcohol-fast has been mistaken in some cases at least, for the morphologically identical *Mycobacterium tuberculosis*'. A full report will be issued later. Notified cases of *influenza* totalled 482, distributed as to 57 Europeans (3 deaths) and Natives 425 (8 deaths) 13 of the European and 218 of the Native cases and all the deaths were due to respiratory complications of the disease. Of other respiratory diseases the following figures appear in the Hospital Returns —

Disease	Europeans		Natives	
	Cases	Deaths	Cases	Deaths
Bronchitis	29	1	144	5
Pneumonia (all forms)	10	2	375	19
Other Respiratory	66	2	107	9

Chief interest regarding *helminthic diseases* continues to centre around *bilharzia* the following comments appears in the Report under review —

"Balovale reports both flukes, *S. mansoni* 73 cases, *S. haematobium* 22 cases. Mongu where conditions would seem to be at least as likely to favour bilharzia disease as those at Balovale again reports no cases.

"Broken Hill reports 338 out of 1,692 native admissions to hospital. The Medical Officer Abercorn remarks the discovery of a focus of bilharzia infection on the Save River where 18 native schoolchildren of Kawimbe Mission were all infected.

At Fort Jameson all cases seen (19) were *S. haematobium*. Infestation by *hookworm* is common. At Broken Hill 24 per cent. of all natives admitted to hospital were infected, while *ankylostomiasis* is reported to be hyperendemic in the Bangweulu swamp villages and in the densely populated stretch of the Luapula River. *Acanthocheilonema persians* continues to be reported, and the Medical Officer Marabuka reports having found in three individuals sheathed microfilariae which he considers to be *Jff bancrofti* the finding requires confirmation—this worm has not previously been reported from Northern Rhodesia. The following figures have been extracted from the Hospital Returns for 1938 —

	Europeans		Natives	
	Cases	Deaths	Cases	Deaths
Ank. haematobium	4	—	541	1
Schistosomiasis	3	—	301	9
Other helminths	6	—	45	—

Veneral diseases are discussed at some length. Syphilis continues to be reported as "widespread in certain areas, with the heaviest incidence generally supposed to be in the Baila country and Barotseland—accurate information is lacking for the Baila country which has no Medical Officer stationed there. The Medical Officer Mongu (Barotseland) treated 283 in-patient and 2,716 out-patient cases of syphilis—in other words syphilis was responsible for over 33 per cent. of all cases treated. The Medical Officer Balovale (Barotseland) treated 497 cases of the disease and remarks on the frequency of primary sores among young married and unmarried girls. Syphilis appears to be comparatively uncommon in the Northern Province: the Medical Officer Abercorn observes that venereal disease is not common. Yaws continues to be local in incidence—the numerous and advanced cases once commonly met with in the Solwezi-Kasempa area are no longer encountered, but the Medical Officer Fort Rosebery reports the disease to be common along the Luera and Luapula rivers. Hospital in-patients treated for venereal diseases were as follows — Europeans syphilis 2, gonorrhoea 1 and Natives syphilis 2,528 gonorrhoea 430 other 1 D 8 and warts 382.

Other diseases referred to in the Report under review include the following. In-patient cases of *leprosy* numbered 172 all were natives. There were notified 42 European and 9 native cases of *measles* a good deal of *whooping cough* was reported and 24 European and 48 Native cases were notified. For *diseases of the skin* 1,580 native

in patients were treated the Medical Officer Abercorn suggests that the frequency of *leg ulcers* and their intractability may be due to some dietary lack. Native in patient cases of *scurvy* numbered 69 of *beriberi* 2 of *pellagra* 13 and of other nutritional diseases 32 the Medical Officer Balovale saw 131 cases of early *scurvy* in village natives. During the year 467 native in patients were treated for various *eye diseases* *conjunctivitis* is specially referred to in reports from four districts. *Rheumatic affections* previously reported from Mongu and from there only to be a cause of moderate disability are again referred to in the report from that station. 371 cases were dealt with. In the 1937 Report reference was made to numerous cases of burning from falling into the fire during a fit and possible causes of the accidents were suggested (see this *Bulletin* 1939 Supp. p. 83*). Mongu once again reports the largest number (56) of these cases but a new suggestion as to their cause is propounded viz. that heavy worm infestation may be responsible and attention is directed to MANSON's observation of the liability to syncope in such infestations [presumably by this is meant a heavy infestation with hookworm].

Scientific—Provision has been made in the 1939 estimates for a laboratory and for the appointment of a pathologist and laboratory assistant (see this *Bulletin* 1939 Supp. p. 83)*. Meanwhile use was made of existing facilities in Bulawayo, Johannesburg and at the Roan Antelope Mine for routine examinations of bloods etc.

Financial—Total expenditure on Medical Department Services during 1938 amounted to £73 109 this sum was equivalent to 4.7 per cent of the revenue of the Protectorate during the same year.

that because of the similarity between this disease and typhus fever native cases may have been incorrectly diagnosed. In the two European cases mentioned above diagnosis was doubtful until the results of serological tests were known.

No case of *human plague* has been reported since 1836. Systematic destruction of field rodents (gerbilles) by the use of poisoned wheat was continued, while native rat-catchers are employed by Government to keep down the rodent population in and around dwelling-houses, shops, etc (see this Bulletin 1938 Supp. p. 97* and 1939 Supp. p. 98*).

Generally speaking *diphtheria* is not prevalent in Basutoland but during the year under review 107 cases were recorded. In 1928 one hundred and eleven cases were reported but during the nine years intervening between 1928-1938 only 53 cases were notified. No explanation can be found for the large numbers occurring in 1838 and 1928. Most of the cases occurred sporadically in villages widely separated and though great pains were taken to link up a common source of infection, results were completely negative.

According to the classified returns 173 out-patients were treated for *fevers of the enteric group*. 100 were admitted to hospitals (104 treated) and 21 hospital deaths were recorded. Among the 104 in-patients 52 were *Bact. typhosum* infections (15 died), one *Bact. paratyphosum B* and in 51 cases (12 deaths) the type of infection was not defined. The protection of village water supplies from pollution should prove effective in reducing the numbers of cases of water-borne enteric which usually occur after the summer rains have set in. For *dysentery* 30 in-patients were treated, 8 amoebic, 14 bacillary and 8 unspecified types of infection. Among out-patients there were 192 patients distributed as to 22 amoebic, 130 bacillary and 40 undefined.

For many years no case of *smallpox* has been notified. The result has been that vaccination has been allowed to lapse and very few children under 15 years of age had been vaccinated. In April a vaccination campaign was inaugurated throughout the Territory and by the end of the year 376 000 persons had been dealt with.

By comparison with 1837 experience the incidence of *tuberculosis* (all forms) has declined, the improvement being attributed to the combined efforts of such factors as better and more abundant food crops and increased employment of Basuto natives in Union mines and industries bringing a corresponding influx of money into the Territory. Out-patient cases numbered 712 and of these 388 were cases of the *pulmonary* form of the disease. Among in-patients there were 63 cases of pulmonary tuberculosis (25 deaths) and 74 cases (8 deaths) of other forms of the disease. It is stated that the Basuto are developing a resistance to tuberculosis. Other *respiratory diseases* mentioned in the Report under review include 4,704 cases of *bronchitis*, 77 of *broncho-pneumonia* and 133 of *pneumonia*. In-patients treated were bronchitis 57 (3 deaths), broncho-pneumonia 37 (8 deaths) and pneumonia 68 (19 deaths).

Badly balanced diets and indifferent hygiene and sanitary conditions are largely responsible for many of the preventable diseases from which the Basuto suffer. *dyspepsia* (5,395 cases) and *constipation* (5,165 cases) account for over 14 per cent of the patients attending Government dispensaries. *Pellagra* is becoming increasingly prevalent and 493 cases were reported in 1938 as compared with 270 cases in 1837. The cause of this increasing frequency of the disease is attributed to the fact

the natives use mill-ground white maize from which the husk has been removed whereas formerly they used stone-ground yellow maize retaining the husk. Other deficiency diseases recorded include 128 cases of *scurvy* and 20 cases of *rickets*.

Leprosy—To the Leper Settlement 110 new cases were admitted 18 recurrences and 22 deserters were readmitted 56 patients died 23 deserted and 36 were discharged so that at the end of the year there were 704 inmates in residence. The Superintendent of the Leper Settlement contributes an exhaustive report of the year's work and this is presented as an Appendix to the Annual Report under review. A recent survey of part of the Maseru District revealed 12 cases of the disease among 34 000 persons examined. Two additional Leprosy Inspectors were appointed during the year and there are now eight of these officers who are said to be keen and efficient and remarkably quick in detecting the disease even in its very earliest stages.

Veneral Diseases—At various dispensaries special clinics are held weekly for dealing with sufferers. *Syphilis* continues to be one of the major health problems of the Territory and the reduction in the ratio of syphilitics to total out patients treated is so small as to be negligible. As regards *gonorrhoea* it is said that recorded figures do not reflect actual incidence for many women fail to seek medical aid in the early stages of infection. Few cases of blindness seem to occur in Basutoland either as a result of *ophthalmia neonatorum* or *gonorrhoeal ophthalmia* in adults. Hospital and dispensary returns show the following cases of venereal diseases treated during the year: *In-patients* syphilis 18 cases gonorrhoea 7 and soft chancre 5 the corresponding figures for *out-patients* being 7 881 1 865 and 82.

Other Diseases referred to in the Report under review and calling for mention in the present Summary include the following. *Of influenza* 1,394 cases were recorded most of them of a mild nature. A mild type of *whooping cough* (718 cases) occurred among the children in most districts. *Tonsillitis* and chronic enlargement of the tonsils are said to be increasingly frequent and during the year 2,083 cases were dealt with. *Rheumatism* was responsible for 3,291 cases and *diseases of the eye* for 2,258 cases.

Financial—Total expenditure on Medical Department Services during 1938 amounted to £47 562 the Leper Settlement accounting for £17 483 of this sum.

BECHUANALAND PROTECTORATE (1938)

Bechuanaland is bounded on the south and east by the Union of South Africa, on the north by Southern Rhodesia, and on the west by South-West Africa. It has an area of about 275 000 sq miles. The High Commissioner for South Africa supervises the affairs of the Protectorate.

Vital Statistics—Vital Statistics in respect of the *Native Population* are not available. The *European Population* is given as 1 939 *births* 34 *deaths* 21 the birth and death rates being 17.5 and 10.8 per 1 000 respectively. According to the Census of 1936 the population of the Territory totalled 260 064.

The Medical Staff (European) during 1938 comprised a Principal Medical Officer (Dr J. W. STIRLING) 9 Medical Officers 5 Subsidized Medical Missionaries and one Subsidized Medical Practitioner.

SWAZILAND—

SAINT HELENA (1938)

Veneral Diseases.—Cases of syphilis treated during the year numbered 384 this figure does not reflect the true position, for it does not include all out-patients seen. Hospital returns show 331 in-patients treated for syphilis, 24 for gonococcal infections and 2 for *granuloma venereum*.

Scientific.—Under this heading can be included the Report of the Medical Officer Mbabane entitled *An Investigation into the Diet of the Pupils at the Swazi National School during 1938* and presented as an Appendix to the Report under review. Briefly the results of the investigation (134 pupils of both sexes) were (a) that boarders appear to gain weight during term time and either remain stationary or lose weight during the holidays the converse appears to apply to day pupils, (b) the diet supplied to boarders is satisfactory but that of day pupils is unsatisfactory.

Financial.—Total expenditure on Medical and Sanitary Services during 1938 was £19,215 a sum which represents approximately 10-4 per cent of the total revenue of the Territory over the same period.

SAINT HELENA (1938)

The Colony of St. Helena consists of the Island of St. Helena (47 sq miles in area) and its dependency the Island of Ascension (54 sq miles in area). St. Helena lies in the South Atlantic in lat. 15°35' S and long 50°42' W and is about 4,210 miles from Plymouth and 1,700 miles from Cape Town. Ascension lies about 700 miles north west of St. Helena.

Vital Statistics.—The population of the Island was estimated to number 4,474. Registered births numbered 173 and deaths 61 the resulting crude birth and death rates being 37.6 and 13.6 per 1,000 respectively. Infant deaths numbered 18 the infant mortality rate being 107.1 per 1,000 births. The heavy increase in the infantile mortality rate is attributed to outbreaks of influenza with accompanying broncho-pneumonia, and malnutrition.

No case of unvailing or death was recorded among the general European population, nor among European Officials.

The Medical Staff comprised the Senior Medical Officer (Dr. J. Gray) and one Medical Officer.

Maternity and Child Welfare Work.—The scheme for the training of midwives (see this Bulletin 1939 Supp. p. 102*) failed to function successfully for though four women worked in the wards for six months, at the end of that time they returned to their homes. Government is to be asked to provide a midwifery ward in the hospital. Two Child Welfare Centres were opened during the year one in Jamestown and one at Hutt's Gate. The Centres were well attended. It is hoped to establish additional centres and to provide for the appointment of a Health Sister who will be able to visit patients in their own homes.

School Hygiene.—The only information under this heading states that regular instruction in the elements of hygiene is given in the schools.

Public Health Sanitation, etc.—In the previous issue of this Supplement reference was made to the dependence of the population of the Island upon the flux industry. During the year under review

the flax mills were closed down owing to adverse trade conditions with consequent unemployment and malnutrition. The under nourished islanders fell an easy prey to *influenza* of which there were three outbreaks (see below). Free issues of vegetables and yeast tablets were provided by Government to the poor.

In Jamestown *sewage* is water-borne but in country districts *bucket latrines* are used and the contents buried at regular intervals. Street refuse is dumped into the sea. Jamestown Longtown and Plantation Ladder Hill are provided with piped water supplies but in other districts the people depend upon spring supplies which are numerous. It is said that 'some improvements' have been effected in housing conditions which however still remain poor (see especially this *Bulletin* 1939 Supp. p 102*).

Port Health Work—Methods remain as previously described in the pages of this *Supplement* during the year 43 ships called.

Hospitals Dispensaries etc—At the Jamestown Hospital 321 cases were admitted and 325 treated with 28 deaths during the year.

The *Outdoor Dispensaries* are three in number and at these centres 8 521 patients were treated. In addition Medical Officers paid 2,416 visits to patients in their own homes and recorded 3,262 surgery attendances of persons requiring treatment.

The condition of the *Prison* and the health of prisoners are reported as satisfactory but conditions at the *Lunatic Asylum* remain unchanged (see this *Bulletin* 1938 Supp. p 103*).

Mention has already been made of the three outbreaks of *influenza* during the year under review. The first occurred in the early months of the year with gastro-intestinal manifestations the second in June mainly affected children with broncho-pneumonia complications in many cases the third outbreak complicated with a few cases of lobar pneumonia, occurred in August. According to the Hospital Returns 22 non fatal cases of *bronchitis* were treated, 19 cases with 5 deaths of *broncho-pneumonia* and 6 cases of *lobar pneumonia* with one death. There is said to be only one known case of *tuberculosis* of the lungs in the Island.

Four cases of *amoebic dysentery* were treated (see this *Bulletin* 1938 Supp. p 108* and 1939 Supp. p 103*) *Ascariasis* and *myiasis* infestations are said to be commonly met with among the children of the poorer classes.

Among other conditions treated and mentioned in the Hospital Returns are 5 non-fatal cases of *beriberi*, 5 cases of *cancer* with 2 deaths 8 non-fatal cases of *rheumatism* and 24 cases of *skin affections* of various kinds.

Veneral Diseases are treated at the dispensaries. *Gonorrhoea* the only form of venereal disease on the Island, showed a considerable increase in incidence during the year figures for out patient cases are not supplied.

Financial—Total expenditure on Medical and Sanitary Services during 1938 amounted to £3 666 a sum which represents 13.6 per cent of the total revenue of the Colony during the same year.

City supply was extended to Khartoum North a purification plant and piped supply was installed at Wadi Halfa, work was commenced on the construction of a similar plant for Malakal town, an additional settling and chlorinating plant was installed at Atbara, and a scheme is under consideration for the provision of a piped supply for Kassala. All supplies were regularly analysed and reported on favourably. Where supplies are obtained from rivers and wells every effort is made to ensure that these are rendered safe.

From the point of view of native housing the Sudan may be roughly divided into three areas. (1) the mud brick house prevails in the Northern area. (2) the thatched hut in the Southern area, and (3) in the Central area the above two types tend to merge. Special attention is being devoted to the Central area where the need for housing improvement is most marked. There was no serious lack of bulk food supplies during the year and but few cases of gross nutritional deficiency were reported. The examination of 40,340 school-children revealed no evidence of nutritional deficiency yet in the opinion of local medical authorities a state of sub-nutrition exists in many areas. A questionnaire has been distributed to administrative officials with a view to obtaining a fuller and more accurate knowledge of the nature and quantities of the diets consumed by the various tribes.

With regard to sanitary staff it is noted that there are 12 British and 11 Sudanese *Sanitary Inspectors*; a sanitary officer is now posted to every Province where British staff is not available. The establishment of 62 posts for *Sanitary Overseers* (see this *Bulletin* 1939 Supp. p. 106*) is now almost complete in the Northern Sudan. In the south seven pupils, who had completed their training, passed the local examination and were posted to districts.

Port Health Work.—During the year 1711 ships arrived at Port Sudan; no ships were quarantined and there were no cases of infectious disease reported from ships. Quarantine restrictions were enforced throughout the year against arrivals from various ports in the Far East. Due control measures continued to be applied to the

in Khartoum are at present being rebuilt a third teaching hospital is situated at Omdurman In the Southern Sudan despite numerous hospitals dispensaries dressers, etc. a considerable amount of sickness is still untreated medical administration in this area is unlikely to develop much further owing to the high cost of all services When preventive medicine plays its full part it is hoped that existing hospital and dispensary services will prove adequate for local needs.

According to the classified returns in addition to the 38 hospitals mentioned above there are upwards of 300 dispensaries total bed accommodation was 5,873

With regard to the work of *Medical Missions* 5 centres are maintained by the Church Missionary Society 4 by the Sudan United Mission and 2 by the American Mission

The curative work carried out at hospitals and dispensaries again shows an increase in the following Table the year's work is summarized —

Item	Euro- peans	Deaths	Non- Euro- peans	Deaths	Total Cases	Total Deaths	Out patient Attend ances
Government Hospitals and Dispensaries	600	11	103,768	2,447	104,368	2,458	6,839,890
5 C.M.S. Hospitals	?	?	?	?	2,549	?	241,378
4 Sudan United Mis sions	?	?	?	?	249	?	20,693
2 American Missions	?	?	?	?	—	—	29,178

Courses of Training continue as previously described (see this Bulletin 1939 Supp p 107*)

Eleven new students were admitted to the *Kitchener School of Medicine* at the beginning of the year and altogether 27 students were under training The Medical School is now organized on a five-year course and the Conjoint Board of the Royal College in England have recognized the time spent in taking the course as counting towards taking a conjoint qualification provided a matriculation standard is reached before students enter the School.

The notes which follow briefly summarize the principal items of *morbidity experience* discussed in the Report under review

The persistence of *smallpox* in the eastern and central Provinces of the Sudan during the past three years illustrates the difficulties encountered in the control of epidemic disease along an extensive land frontier in a country where there is a constant traffic of wandering homeless natives over many and devious routes. During the year under review outbreaks of the disease occurred in Kassala, Blue Nile, Kordofan, and Darfur Provinces and were only kept under control by constant effort and vigilance. Altogether 527 cases with 158 deaths were reported. Vaccination was vigorously carried out in all infected areas and 1,347,253 persons were vaccinated

Relapsing fever which had spread into the Eastern Sudan from Abyssinia, occurred sporadically in Kassala and Blue Nile Provinces and two small outbreaks were also reported in Darfur 1,124 cases with 116 deaths were recorded, 670 of the cases and 51 of the deaths

occurring in the Blue Nile Province. An extensive delousing campaign was organized.

The extensive epidemics of cerebrospinal fever in the Central Sudan during the past few years appear to have died down and only sporadic cases were reported during the year under review except in the Aweil district of Equatoria where 172 cases with 85 deaths were notified out of a total of 234 cases and 124 deaths in the Sudan as a whole.

During the year 11,573 cases of malaria were admitted to hospitals and there were 84 deaths, 174 of the cases and 3 of the deaths occurring among Europeans. The numbers of out patients treated in the Sudan are not stated, but in the Blue Nile Province hospital out-patients numbered 11 056 and dispensary out-patients 49 560 and in Khartoum Province 23 721 cases were reported. Blackwater fever was responsible for 29 cases and 8 deaths.

At the Stack Medical Research Laboratories where 1,863 blood films were examined, 467 were *subtertian*, 85 *benign tertian* and 10 *quartan* infections.

Fever of the *exigua* group accounted for 213 cases and 29 deaths of the total cases recorded 209 were *Bact. typhosum* and 4 were *Bact. paratyphosum A* infections. All the cases were admitted to hospitals; it is noted that 108 cases and 8 deaths occurred in Khartoum Province. At the Stack Medical Research Laboratories Vidal tests were applied to 1,396 samples of serum. 213 reacted positively with *Bact. typhosum* and one with *Bact. paratyphosum A*.

Among 3 023 cases of dysentery admitted to hospitals, 2,896 were diagnosed as amoebic (51 deaths) and 137 as bacillary dysentery (15 deaths); it is added that in all probability bacillary dysentery is more common than these figures indicate. Faecal specimens examined at the Stack Medical Research Laboratories numbered 1 804; the *Flexner* bacillus was isolated in 64 cases, *Shiga's bacillus* in 16 amoebae were present in 22, and ova in 62.

Kala-azar is mildly endemic along the eastern border and sporadic throughout the western, central and southern Sudan during the year hospital cases numbered 295 and deaths 47. Investigations are being carried out regarding the etiology of the disease.

Sleeping sickness remains endemic in the Zande district of Equatoria Province of the 110 cases reported during the year (only one death) 108 occurred in the eastern Zande district and 4 in the Kajo-Kaji district. The modification in the preventive measures taken against sleeping sickness introduced in 1937 has been found to work satisfactorily. Towards the end of 1937 an additional Assistant District Commissioner was appointed to supervise the native authorities in the Lulu area (Zande district) in carrying out their administrative duties in connexion with the sleeping sickness campaign.

The incidence of tuberculosis is said to show no change. 1 027 cases were admitted to hospital and 184 deaths were recorded. 623 of the cases and 128 of the deaths being due to the pulmonary form of the disease. In the Wadi Halfa and Dongola districts of the Northern Province incidence is higher than in the remainder of the Sudan. This is said to be partly due to the return of infected persons from Egypt where climate and conditions of work predispose them to the disease. At the Stack Laboratories 7 out of 49 specimens of sputum examined were positive with *Mycobacterium*.

During the year 557 persons received anti-rabic treatment of these 483 had actually been bitten—464 by dogs, 9 by donkeys, 3 by horses.

2 each by cats byaenas and monkeys and one by a fox and 74 had been in contact with rabid animals. There were 8 fatal cases the biting animal in each case being a dog. It is said that the measures in force ensure that the chances of being bitten are reduced to a minimum. At the Stack Laboratories 119 brains were received but only 108 were fit for examination. 32 were positive for *Negri* bodies and of the positives 25 were the brains of dogs 5 of monkeys one sheep and one jackal.

The *Ophthalmic Report* contributed by Dr A. R. McKELVIE, provides a detailed report of the year's work (see also this *Bulletin* 1939 Supp p 109*). At the River Hospital Khartoum 615 ophthalmic cases were treated and at the Omdurman Hospital 125 out-patients at these hospitals numbered 6 019 and 6 336 respectively. Among the in patient cases at the River Hospital 75 patients were treated for *trachoma* and in addition there were 703 out patients treated for this condition. In all hospitals in the Sudan 3 714 in patients were treated for *diseases of the eye* and among them were 502 cases of *trachoma*. At the Stack Laboratories research work in connection with *trachoma* is being carried out in collaboration with the Ophthalmic Surgeon.

With regard to *helminthic diseases* among other references the following appear in the Report. *Ankylostomiasis* is of no importance in the Northern Sudan, but it constitutes a major problem west of the White Nile in Equatoria. The incidence of *bilharziasis* is negligible though it is only by constant effort that it is possible to prevent the irrigated area of the Gezira from becoming an endemic centre. *S. mansoni* is prevalent in some districts in Equatoria Province and though generally mild is the cause of disability in certain areas. *Dracontiasis* is the cause of much disability in the Nuba Mountains Equatoria Province and the Bor district of Upper Nile Province. According to the classified Hospital Returns 1 265 in-patients were treated for *ankylostomiasis* 1 884 for *bilharziasis*, and 832 for *gumeworm*.

The incidence of *leprosy* so far as can be assessed is said to show little change. It is a comparatively rare disease in the northern third of the Sudan in the Central Sudan incidence is heavy among certain tribes but rare among the nomads in the Southern Sudan incidence is very high in many parts of Southern Equatoria, particularly in the Zande district (see also this *Bulletin* 1939 Supp p 111*). During the year 6 701 cases were recorded.

With regard to *venereal diseases* it is said that the incidence of *syphilis* remains high but that fortunately the Sudanese have a racial immunity and the more serious complications are not seen among them. *Gonorrhoea* is more serious from the public health point of view and more difficult to deal with and has a marked adverse effect on the birth rate in the Northern Sudan. In the Southern Sudan incidence is considerably less than in the remainder of the country.

Disease	Cases	
	Europeans	Non-Europeans
Syphilis	1	18 315
Gonorrhoea	1	2,585
Soft Sore	1	346
Yaws	—	1,534

Yaws has been eliminated from the Sudan except for a few remote districts in the South (see this *Bulletin* 1939 Supp p 111*) The classified hospital returns supply the data for in-patient cases as in the table above (p 75)

Other diseases mentioned in the report include the following. There were 81 cases of *diphtheria* with 13 deaths, all provinces with the exception of Darfur and Upper Nile being affected. Outbreaks of a virulent type of *influenza* with considerable mortality occurred in the Equatoria Province and in the Nuba Mountains, with minor outbreaks of a mild type in other areas. hospital returns show 1,205 in-patient cases with 9 deaths. *Tumours* were responsible for 641 cases, of which 196 were classified as *malignant*. For *undulant fever* 28 persons were treated as hospital in-patients. it is said the disease is probably more common than the figures indicate particularly in Kassala Province. *Pneumonia* (epidemic) accounted for 1,480 cases and 299 deaths, *chickenpox* for 873 cases *measles* for 299 *rheumatism* for 292, and *tropical ulcers* for 4,931. Among the *deficiency diseases* it is noted that *scurvy* was responsible for 145 cases and *pellagra* for 9.

Scientific—Despite the fact that as much routine work as possible is carried out at the provincial hospital laboratories (of which there are 24) somewhat unexpectedly the work of the central laboratories (*Stock Medical Research Laboratories*) has shown a tendency to increase. Dr E. S. HORCAX Assistant Director Laboratory Services, observes that 22,633 specimens were received and examined some of these and the findings recorded having been the subject of brief mention under various headings in the preceding notes. Important *research work* was undertaken the specific investigations in progress being concerned with *vibrio relapsing fever kala-azar trachoma yellow fever* these studies are described at length in the Report.

The Government Entomologist continued his studies of the bionomics and breeding places of anopheline mosquitoes in the Gezira and Khartoum Districts. In collaboration with the research work in progress at the Stock Laboratories, attention was devoted to a survey of *sandflies* in relation to the incidence of *kala-azar*. The tick *O. sergenti* And., sometimes regarded as a potential vector of *relapsing fever* was recorded for the first time from Wad Medani where it was found in a cattle enclosure "in such large numbers that several kilograms of ticks were collected in a few minutes. Other work included experiments in connection with the control of *Chironomidae* in Khartoum, the collection and determination of insects from aircraft arriving and the identification of insects of medical importance received from collectors in many parts of the country.

Financial—Total expenditure of the Sudan Medical Service during 1938 amounted to £ E.283,630

MEDITERRANEAN

PALESTINE (1938)

Palestine on the western edge of the continent of Asia at the eastern extremity of the Mediterranean Sea is bounded by the Mediterranean on the west, Syria on the north Trans-Jordan on the east and the Egyptian Frontier District of Sinai on the south. It has a total area of about 10 100 sq miles (somewhat larger than that of Wales). The chief town and seat of government is Jerusalem other important towns are Gaza, Tel Aviv Acre Jaffa and Haifa, the last two being also the chief ports. Palestine is administered under a Mandate from the League of Nations.

ital Statistics—Owing to the disturbed state of the country there was some interruption in the notification of village births and deaths for registration during the latter part of the year. Prior to 1938 the compilation of statistics was performed monthly in each District Health Office but from the beginning of 1938 new notification forms were introduced and compilation of data was undertaken by the Office of Statistics. A very complete account of the organization of these services is provided and the data are presented in numerous tabular statements probably the most comprehensive account provided in any Colonial Medical Report. For purposes of the present summary only the principal vital facts can be presented in summary form as follows —

Community	Mean settled Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Moslems	826 448	39 050	47.3	15 461	18.7	4,883	127.6
Jews	402,244	10,563	26.3	3 282	8.1	618	88.5
Christians	111 165	3,518	34.4	1,392	12.5	397	104.0
Others	11 782	499	42.4	198	16.8	45	90.2
Totals	1 351 639	53,030	39.0	20,313	15.0	6,043	112.1

The *mean settled population* (see above) on which crude birth and death rates were calculated does not include the Beduin tribes. During the year under review registered births have been allocated to the habitual residence of the mother and deaths to the habitual residence of the decedent whereas in previous years they were classified according to the place of registration.

The *Medical Staff* comprises a Director of Medical Services (Col. G. W. HERON C.M.G. etc.) two Deputy Directors eight Senior Medical Officers 5 Assistant Senior Medical Officers 48 Medical Officers and 2 Lady Medical Officers.

Maternity and Child Welfare Work—Midwifery cases delivered in Government Hospitals again show an increase. There were 684 admissions to the Princess Mary Maternity Wards of the Jerusalem Government Hospital resulting in 566 live births and 6 maternal deaths and in the hospitals at Haifa Nablus Jaffa, and Gaza 369 cases were dealt with. There are 532 qualified *midwives* licensed to practise and 1 196 unqualified *dayas* (holding annually renewal permits) the majority of whom work in village and rural areas and are inspected at least twice a year as regards their equipment and general

fitness to attend upon women in labour. At the Government Midwifery Training School, Jerusalem, 7 Graduate Nurses and 10 Pupil Midwives qualified for licences to practise midwifery, and 3 others qualified at the Training School of the Hadassah Medical Organization.

The Medical Department maintains 33 *Infant Welfare Centres* and participates in the administration and support of others. The Government contributes to the maintenance of centres administered by the various Jewish medical organizations. There are 49 welfare centres functioning in the interests of Jewish children. In the following statement, the year's work dealt with at the different centres is summarized—

Supporting Organization	No. of Centres	Children on Registers	Attendances Recorded	Home Visits by Nurses
Government	33	7,070	203,008	99,450
Municipalities	8	4,552	78,801	14,558
Hadassah Medical Organization	17	2,808	66,579	16,039
Jewish Federation of Labour	17	2,265	35,575	3,580
Women's International Zionist Organization	9	657	17,762	2,680
Local Committees	4	807	33,040	8,043

The Gynaecological Clinics conducted by Women Doctors primarily in the interests of Moslem women were subjected to interruptions due to civil disturbances; yet 1,628 new patients were dealt with (1,315 being Moslem women) and approximately 17,000 attendances for treatment were recorded.

School Hygiene—The work of the *School Medical Service* continues to expand, for during 1938 the Department of Health had to arrange for the sanitary supervision of 460 schools with a student population of 18,485. During the year under review 33,012 children were medically examined. The principal findings recorded were that 36 per cent. of the children examined in town schools and 53 per cent. in village schools were suffering from *trachoma*, and that a slight increase was noticed in the numbers of children with enlarged spleen, and of those found verminous. Total attendances of children for ophthalmic treatment numbered 2,807,639. Children examined for the presence of splenic enlargement numbered 35,874 in the town schools and 35,076 in village schools; the recorded rates for town schools was 1.4 and for village schools 4.3.

The *Jewish School Medical Service* which receives financial aid from Government dealt with 392 schools having a student population of 51,290.

Public Health Sanitation, etc.—Despite adverse conditions and increasing poverty, the general health of the population at large was more satisfactory on the whole than in the preceding year. Town Arabs were specially affected by adverse economic conditions, but the Jews, assisted by external funds, did not feel the pinch to the same extent. The personnel of the Department continued to carry out their duties in the face of civil disturbances and personal risk. There was no relaxation of *anti-malarial* activities either in urban or rural areas. Although no new major schemes of anti-malarial drainage

were undertaken works previously embarked upon were completed or improved (see this *Bulletin* 1939 Supp p 116*) The mosquito catching stations (of which there are 67) operate as information guides to dangerous breeding-places the number of these stations is to be considerably increased in the near future

No significant progress is reported in connexion with schemes for the main sewerage of principal towns Municipal Sanitary Services were carried out in a year of civil disturbance in the face of constant difficulties and dangers in both Jerusalem and Haifa inspectors were assassinated whilst engaged on their duties and the very greatest credit is due to officers for the manner in which they maintained public services at great personal risk Owing to financial stringency and the general unrest in rural areas little progress is recorded in the installation of *village latrines* Disposal of refuse is still reported to be unsatisfactory in the Haifa Jaffa and Tel Aviv areas

There was no material advance in the development of *water supplies* There was no marked shortage of water in the Arab villages. The Report of the Consulting Engineers on the Haifa supply was received and advocated the development of the Jelami and Wadi Fellah sources. Owing to the political situation steps for the raising of a loan for this essential undertaking had to be suspended. The health standards of industries dealing with food were maintained and a much closer control of the quality of foodstuffs was possible by the application of the Public Health (Rules as to Food) Ordinance

No change is recorded in the numbers or disposition of the *Railway Medical Staff* Routine work continued to be carried out along the lines previously described 9,492 new cases and 14,930 attendances were recorded at the clinics for railway employees The *Prison Medical Service* was taxed to the utmost as a result of conditions of unrest during the year Existing prison accommodation proved inadequate and temporary camps had to be opened. The average prison population was 3,245 and approximately 78,500 attendances for treatment were recorded at central prisons detention camps etc. during the year

Port Health Work—The necessary buildings, completed and equipped the Tel-Aviv Jetty and Lighter Harbour section of Jaffa port was opened to passenger and immigrant traffic in May 1938 A large proportion of passenger traffic was diverted to this landing stage and 28 per cent of the persons arriving in Palestine by sea, disembarked at Tel Aviv The following data relate to the volume of sea traffic dealt with during the year —

Port	Vessels Arriving		Travellers Disembarked		
	Steam	Sail	Immigrants	Others	Totals
Jaffa	1,463	534	49	2,478	2,527
Tel Aviv	789	30	3,670	8,885	12,435
Haifa	2,234		7,237	20,834	28,071
Acre and Gaza	357 (mainly coastal sailing vessels)				

Aerial traffic continues to increase. During the year 2,675 aircraft landed at the airports of Lydda Haifa, and the seaplane base on Lake Tiberias 9 aircraft also called at the Gaza landing ground but this aerodrome was closed to civil traffic at the end of February

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Supporting Organization	N. of Centres	C. R.
Government	33	4
Municipalities	6	
Hadassah Medical Organisation	17	
Jewish Federation of Labour	17	
Women's International Zionist Organisation	9	1
Local Committees	4	

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 more satisfactory on the whole than in th
 Arabs were specially affected by adverse eco
 Jews assisted by external funds did not fe
 extent. The personnel of the Department
 their duties in the face of civil disturbances;
 was no relaxation of *anti-malarial* activities
 areas. Although no new major schemes o

were undertaken works previously embarked upon were completed or improved (see this *Bulletin* 1939 Supp p 116*) The mosquito catching stations (of which there are 67) operate as information guides to dangerous breeding places the number of these stations is to be considerably increased in the near future

No significant progress is reported in connexion with schemes for the main *sewerage* of principal towns. Municipal Sanitary Services were carried out in a year of civil disturbance in the face of constant difficulties and dangers in both Jerusalem and Haifa inspectors were assassinated whilst engaged on their duties and the very greatest credit is due to officers for the manner in which they maintained public services at great personal risk. Owing to financial stringency and the general unrest in rural areas little progress is recorded in the installation of *village latrines*. Disposal of *refuse* is still reported to be unsatisfactory in the Haifa Jaffa and Tel Aviv areas

There was no material advance in the development of *water supplies*. There was no marked shortage of water in the Arab villages. The Report of the Consulting Engineers on the Haifa supply was received and advocated the development of the Jelami and Wadi Fellah sources. Owing to the political situation steps for the raising of a loan for this essential undertaking had to be suspended. The health standards of industries dealing with food were maintained and a much closer control of the quality of foodstuffs was possible by the application of the Public Health (Rules as to Food) Ordinance

No change is recorded in the numbers or disposition of the *Railway Medical Staff*. Routine work continued to be carried out along the lines previously described. 9,492 new cases and 14,930 attendances were recorded at the clinics for railway employees. The *Prison Medical Service* was taxed to the utmost as a result of conditions of unrest during the year. Existing prison accommodation proved inadequate and temporary camps had to be opened. The average prison population was 3,245 and approximately 78,500 attendances for treatment were recorded at central prisons detention camps etc. during the year

Port Health Work—The necessary buildings completed and equipped, the Tel Aviv Jetty and Lighter Harbour section of Jaffa port was opened to passenger and immigrant traffic in May 1938. A large proportion of passenger traffic was diverted to this landing stage and 28 per cent of the persons arriving in Palestine by sea, disembarked at Tel Aviv. The following data relate to the volume of sea traffic dealt with during the year—

Port	Vessels Arriving		Travellers Disembarked		
	Steam	Sail	Immigrants	Others	Totals
Jaffa	1,463	534	49	2,478	2,527
Tel-Aviv	700	30	3,570	8,863	12,433
Haifa	2,234		7,237	20,834	28,071
Acro and Gaza	357 (mainly coastal sailing vessels)				

Aerial traffic continues to increase. During the year 2,675 aircraft landed at the airports of Lydda Haifa and the seaplane base on Lake Tiberias. 9 aircraft also called at the Gaza landing ground but this aerodrome was closed to civil traffic at the end of February.

The medical surveillance of travellers and immigrants was continued and 45,646 persons entering the country by sea and air were notified to their destinations for health surveillance. The usual arrangements controlled the movements of pilgrims 609 Palestinians and 28 Trans-Jordan residents proceeded on the pilgrimage to Mecca. All returning pilgrims are subjected to surveillance for five days at their destinations.

Hospitals Dispensaries, etc.—The hospitals of the Government throughout the country worked at full pressure the number of surgical cases due to the civil disturbances was a marked feature of the year's hospital work. The new Haifa Hospital (220 beds) was completed in August patients and equipment was transferred from the old buildings in September and the official opening took place in December. The British section of the Jerusalem Hospital was expanded by 18 beds, temporary increases in accommodation were provided at the Nablus and Safad hospitals and an Infectious Diseases hospital is in process of construction at Jerusalem.

The voluntary hospitals and dispensaries continue to provide a large proportion of the total medical aid for the population of Palestine. The Hadassah Medical Organization which maintains a hospital of 190 beds in Jerusalem a tuberculous hospital of 38 beds at Safad and numerous medical facilities has in course of construction a new hospital of 300 beds. The voluntary hospitals are described at some length in the Report under review but for purposes of the present summary details relating to Government and Voluntary Institutions must be condensed as follows—

Description	Beds	Admissions				Deaths
		Muslims	Jews	Christians	Others	
8 Government Hospitals	684	9,776	1,269	2,654	50	801
1 Mental Hospital	157	—	2	3	—	3
4 Prison Sick Wards	72	1,021	116	38	—	—
Tel-Aviv Municipal Hospital	234	—	7,335	35	14	485
29 Voluntary Hospitals	1,940	9,027	18,709	4,621	25	1,269

Out-patient treatment is provided at 19 Government and one Municipal general and 83 special clinics—ophthalmic, venereal, tubercular. Each one of the special clinics new cases treated at the 20 general clinics numbered 177,638 and of these 7,707 were cases of eye diseases and 2,092 were cases of malaria of the total cases recorded 134,996 were Muslims.

There are 40 Voluntary Dispensaries and Clinics established in eleven towns and at these centres 691,533 new cases were seen, among them 100,282 cases of eye diseases and 2,558 cases of malaria. By comparison with patients treated at Government Clinics, the majority of the patients treated at the Voluntary Clinics were Jews, their numbers being 571,901.

During the year under review 24,833 Voluntary Village Clinics were held under the auspices of six separate organizations. At these centres 277,868 new cases were seen and of these 268,572 were Jews. The recorded cases included 12,721 cases of eye diseases and 1,773 cases of malaria.

Apart from ophthalmic work carried out at general out-patient dispensaries special centres to deal with eye diseases only functioned

in eleven towns with first-aid units operating in 23 villages while the special Mobile Unit operated in 12 village areas not served by the permanent ophthalmic clinics. The classified ophthalmic returns show that 64 591 new patients were treated for all eye conditions and that 945 129 attendances were recorded *trachoma* being responsible for 53 636 and *acute conjunctivitis* for 27 966 cases

Nurses under training at recognized training schools numbered 287 of whom 100 were in the first year 96 in the second and 91 in the final year of instruction Successful candidates at the Nurses Examinations held during 1938 were First Year 84 Second Year 75 and Final (third) Year 33

The Report under review discusses in varying detail specific notifiable and general diseases featuring the health experience of the country during 1938 the notes which follow being brief summaries of some of the more important of these references.

The *malaria* incidence in urban and controlled areas was negligible and low in the country as a whole no epidemic manifestation of the disease was recorded during 1938 According to the classified returns of notified infectious diseases 1,849 cases of malaria were reported with 8 deaths. At public dispensaries where 869 171 patients were treated for all causes 4 648 were cases of malaria Two fatal cases of *blackwater fever* were notified. At the Health Department Laboratories 9,531 blood films were examined for the presence of malaria parasites, and 1 245 positive findings were recorded. The percentages of type incidence among the positive cases were *benign tertian* 59 *ambertian* 39 and *quartan* 2 per cent

A satisfactory decline in the incidence of *cerebrospinal meningitis* is noted only 14 cases and one death being recorded during 1938. Of *relapsing fever* 67 non fatal cases were notified at the Laboratories *S recurrentis* was identified 43 times during the examination of 9 531 blood films. There were 176 cases of *typhus fever* of the mild murine type exclusively among Jews. Among 30 809 samples of serum examined at the Laboratories 218 agglutinated positively with *Proteus* X19 No cases of *smallpox* were notified but protective vaccination against the disease was continued throughout the year and 55 422 vaccinations were performed.

Three fatal cases of *rabies* were recorded, but during the year 2 102 persons were bitten and 1 949 were actually treated at one or other of the 40 anti rabies treatment centres in the country A full account of the policy of the Health Department in anti rabic treatment, results of treatment measures of control etc. is presented in the Report of the Laboratory Services.

Typhoid fever was responsible for 1 643 cases and 155 deaths and *paratyphoid* for 152 cases and one death. As in the preceding year the Nabulus district was responsible for the greatest number of cases viz 458 cases of typhoid with 47 deaths. Among the Jews previously the chief reservoir of typhoid 354 cases and 15 deaths were recorded. At the Laboratories agglutination tests were applied to 30,809 samples of serum, 1 113 reacted positively with *Bact typhosum* 92 with *Bact paratyphosum A* 103 with *Bact paratyphosum B* and 19 with *Bact paratyphosum C* The results of 8 009 cultural examinations showed *Bact typhosum* to be present in 25 cases and *Bact paratyphosum A* and *B* each in 3

Notified cases of *dysentery* numbered 903 with 28 deaths notification of this disease is said to be unreliable. At the Laboratories 19 413

microscopic and 8 009 cultural examinations of faecal specimens were carried out. The positive findings by microscopic examination included *E. histolytica* (free) 271 *E. histolytica* (cyst) 296, while the positive results of the cultural examinations showed that among the dysentery group *Bact. dysenteriae* Flexner Y was isolated 178 times, Strong 36, Shiga 32, Schmitz 27 and Sonne 12.

Control of tuberculosis—one of the important endemic diseases in Palestine—continued to be concentrated in the special clinics. The scheme for a Tuberculosis Service (see this *Bulletin* 1939 Supp. p 120*) envisaging the establishment of a 50-bed sanatorium at Nazareth, and a general dispensary service for the whole country had again to be deferred on grounds of financial stringency. In these circumstances hospitalization was only possible in a very few cases. Jewish organizations on the other hand provide hospital accommodation for their tuberculous patients and the Safed Tuberculosis Hospital, providing 58 beds, was again subsidized by the Department of Health. During the year 461 cases with 221 deaths were notified, 367 of the cases and 178 of the deaths being due to the pulmonary form of the disease. Of the total notifications received 389 of the cases and 169 of the deaths occurred in towns, and 72 cases with 52 deaths in the villages. The tuberculosis clinics established in the larger centres continued to do valuable work. 292 cases (223 were of the pulmonary type) and 7 132 attendances for treatment were recorded. These figures mainly relate to the Arab community since the majority of the Jewish cases are dealt with by the Jewish Tuberculosis League which continued its activities as in previous years. Pneumonia caused the deaths of 1,313 persons (out of 8,233 deaths due to all causes) in the 29 principal towns during 1938, and though notification of the disease is incomplete 470 cases with 388 deaths were reported in the country as a whole. At the Laboratories where 5,827 specimens of sputum were examined microscopically 623 contained *Mycobacterium tuberculosis* and *Streptococcus pneumoniae* was present in 22 cases.

The campaign for the investigation and treatment of hookworm was continued along lines adopted in previous years, though the work suffered curtailment in rural areas, and the activities of the special unit employed had to be suspended towards the end of the year. No adequate control of the citrus industry was possible owing to the terrorist activities in these areas (see this *Bulletin* 1939 Supp. p. 120*). Altogether 3 713 persons were examined from areas on the Coastal plain in the Jaffa district—the infestation rates varied from 2.6 to 8.0 in the urban Arab districts from 14.2 to 59.9 in the rural Arab areas and from nil to 5.7 in rural Jewish areas.

The special *bilharzia* investigation unit also worked under conditions of exceptional difficulty. During 1938 an attempt was made to discover incidence of the disease in areas at a distance from those of proven endemicity (see this *Bulletin* 1939 Supp. p 120*). Upwards of 1,800 persons were examined but only 12 were found to be infected. In the Report of the Laboratory Services it is observed that 19 413 microscopic examinations of faecal specimens were carried out the principal findings being *Ascaris* 1 451 *Trichuris* 2,041 *Taenia* 301 *Ancylostoma* 140 and *S. Mansonii* 131 while among 32,526 specimens of urine examined 114 were found to contain the ova of *S. haematobium*.

Seven cases of leprosy were reported during the year at the Laboratory 18 out of 7 494 naso-pharyngeal swabs examined were positive with *Mycobacterium leprae*.

Venereal Diseases—At the four main treatment centres work continued to increase—a specially trained officer supervises the work in general while on the female side two Lady Medical Officers operate through the medium of the gynaecological clinics among the women. During the year 1 875 cases of syphilis 591 of gonorrhoea and 42 of soft chancre were reported while attendances for treatment totalled 42 730 an increase of nearly 6 000 over the 1937 figures. The campaign against endemic syphilis in the Hebron sub-district (see this *Bulletin* 1938 Supp. p 126* and 1939 Supp. p 120*) was continued until the latter part of the year when increasing lack of security led to suspension of work in the area. With regard to the serological diagnosis of syphilis at the Laboratory 12,844 specimens of blood serum were examined by the M R C No. 1 method and positive findings were recorded in 1 575 cases the Kahn test was applied to 830 specimens with positive results in 130 cases. Among 1 923 urethral and vaginal smears 513 were found to contain *N. gonorrhoeae*.

Other diseases mentioned in the Report include 19 cases of acute poliomyelitis with one death, 20 non fatal cases of anthrax 256 cases of diphtheria with 19 deaths 3,219 cases of measles with 175 deaths 67 cases of scarlet fever (1 death) and 8 cases of kala-azar (1 death).

Scientific—The Health Department Laboratories continued to function and catered fully for all public health requirements. The laboratory accommodation at the New Haifa Hospital (see above) is designed for both bacteriological and chemical work. During the year it was necessary to extend the services available in the Jaffa District. The *Bacteriological Division* reports that 255 239 specimens were received and dealt with during the year. The principal findings recorded have already been the subject of brief mention in the preceding notes but it remains to add that the Division prepared large stocks of prophylactic vaccines etc. for use in the country. In the *Entomological Division* the identification and classification of insects of medical importance was continued. From 1 780 rats caught at Palestinian ports 6 618 fleas were taken for examination as usual *X. cheopis* is the commonest rat flea representing 63.3 of the infestation. The *Chemical Division* dealt with 14,520 samples of various kinds and of these 8 738 were examined on behalf of public health authorities 3 391 for the Customs and Excise authorities and 1,581 for the Department of Agriculture and Fisheries. Special investigations undertaken include further work on the influence of absorption ions and neutral salts on the pH of soils and experiments on the effects of saline water on the loess type of soils in the Beersheba area. The following papers on agricultural subjects were published—

MENCHIKOWSKY (F) & PUFFLES (M) The Relation of Exchangeable Cations to the Active Aluminium in Soil.—*Soil Science* 1938 Vol. 45 No. 1

PUFFLES (M) & ADLER (S) The Effect of Sheep and Goat Manure on some Mediterranean Red Soils.—*Soil Science* 1938 Vol. 46 No. 4

Financial—The estimated expenditure of the Department of Health for the financial year (1st April 1938—31st March, 1939) is £P 245 646 a sum which represents 4.6 per cent of the total estimated expenditure of the Government over the same period.

EMIRATE OF TRANS-JORDAN (1938.)

Trans-Jordan, which is administered under the same Mandate as Palestine is a strip of country bounded on the west by Palestine, on the north by Syria, on the east by Iraq, and on the south by Saudi Arabia, with access to the Red Sea at Akaba. Its area is unknown as the boundaries are not definitely determined. Amman, the capital, is on the Hedjaz railway.

The Annual Medical Report for 1938 had not been received at the time of going to press on February 26th 1941.

CYPRUS (1938)

Cyprus, an island in the eastern Mediterranean, lies some 40 miles south of Asia Minor, 60 miles west of Syria and 240 miles north of Egypt. Its area is 3,584 sq. miles (about that of Norfolk and Suffolk combined). Nicosia, its capital, lies near the centre of the island.

Vital Statistics.—The total population of the Colony at the middle of the year was estimated to be 374,654. The birth and death rates were 31.2 and 14.5 per 1,000 respectively, and the *infant mortality rate* 130.9 per 1,000 live births.

European Officials resident numbered 114 with an average number resident of 89. Two deaths and one invaliding were recorded. Of *Cypriot Officials* there were 1,980 resident with an average number resident of 1,931. Five were invalided and five died.

The Medical Staff during 1938 comprised a Director of Medical Services (Dr E. A. HERR), 9 Specialists (Surgeon, Pathologist, etc.), 3 Medical Officers 1st Grade, 15 2nd Grade, 8 District Medical Officers and 6 District Surgeons, one School Medical Officer, one Dental Officer, one Temporary Medical Officer and three Cypriot Health Officers. In addition there are 14 Honorary Medical Specialists.

Maternity and Child Welfare Work.—Hospital in-patients treated for conditions associated with the *puerperal state* numbered 701 with 16 deaths. These figures include 427 cases of normal labour with 13 deaths. There were also 545 out-patient cases. The Nicosia Maternity Wards dealt with 422 labour cases, 10 maternal and 15 infant deaths were recorded. *The training of midwives* was continued, 23 pupils attended the classes and all were successful at the local examination. Government midwives attended 340 confinements during the year. *Child Welfare Centres* operate successfully in all the important towns and the work steadily increases. An *infant malaria survey* was carried out by the personnel of the International Health Division of the Rockefeller Foundation in Cyprus and 1,308 babies were examined. The general positive percentage for all areas was 3.7.

School Hygiene.—There is no comprehensive School Medical Service though the School Committees of the principal towns have their own doctors and all schools are visited by Government Medical Officers and by Government and Honorary Dentists. Four new *School Dental Clinics* were established during 1938 and the services of the five Honorary Dentists have been extended to 541 villages. 6,379 school-children were examined and only 1,215 were found to be free from carious teeth. Most school-children of the principal towns are given the opportunity of one nourishing meal a day provided by the Municipality.

Public Health Sanitation etc.—The approved scheme of reorganization of Medical Department services described in the 1938 Report (see this *Bulletin* 1938 Supp p 128*) was completed and brought into full operation during the year all six Districts are now under the charge of a responsible officer and medical and health services now become available to a larger proportion of the population than formerly. The sanitary branch of the Department has also been reorganized. With regard to *malaria control measures* it is said no major drainage work was undertaken the measures generally adopted were the routine treatment of breeding places. Intensive control work was carried out in the Kyrenia District under the supervision of the Sanitary Engineer to the Rockefeller Foundation full details are presented in an Appendix to the Report under review. Methods of *sewage disposal* remain as previously described under rules now being adopted by village Authorities every new building must be provided with an approved type of latrine. The *water supplies* of Nicosia, Larnaca, and Kyrenia are liable to contamination under existing conditions new water supplies were reported upon and samples of water submitted to chemical and bacteriological analysis. Two groups of villages are being intensively dealt with under the *Rural Development Scheme* (see this *Bulletin* 1939 Supp p 127*). *Housing conditions* are receiving special attention the Department is now able to exercise considerable control over new premises with respect to sanitation and hygiene. The development of the *mining industries* in some areas is causing overcrowding in nearby villages. Under the powers of the *Trades and Industries (Regulation) Law* the Department has been able to bring about much sanitary and hygienic improvement in the trades and industries scheduled. The *Standing Committee on Nutrition* has completed its work and an interim report is about to be published. It was always thought that diet deficiency diseases were absent from Cyprus but several typical cases of *pellagra* were seen and treated during the year. A new Law was enacted controlling the sale of Food and Drugs.

At the end of the year arrangements were completed to open the *School for Sanitary Inspectors* in January 1939.

Port Health Work—During the year under review 731 steam and 562 sailing vessels entered Cyprus ports and 45 aeroplanes landed at Cyprus aerodromes.

Hospitals Dispensaries etc—Work on the new hospital at Nicosia steadily proceeds. Patients admitted to District and Rural Hospitals during 1938 numbered 6 597 (in the classified returns *admissions* are given as 6,380 *treated* as 6,520 and *hospital deaths* 120. Reference has been made in previous issues of this *Supplement* to the conflicting numerical statements appearing in the Cyprus Medical Report) *Out-patients* seen at hospitals and rural dispensaries numbered 95 450.

Training of Nurses—Four more Cypriot girls were selected and entered the School of Nursing Beirut, in September (see this *Bulletin* 1939 Supp p 128*).

Hospitals and Rural Dispensaries dealt with 11 654 cases of *malaria* (in another section given as 10 956) during the year. The decline in recorded cases is attributed to the intensive control work carried out over 215 square miles utilizing Paris green in liquid form this work is to be further extended. The *Bureau of Malaria Control* of the Rockefeller Foundation in Cyprus contributes a comprehensive account of the year's work in an Appendix to the Report under review.

Hospital in-patients numbered 422, distributed as to 278 benign tertian 34 quartan 42 subtertian 63 cachexia and three cases of blackwater fever. At the Laboratory 397 blood films were examined for the presence of malarial parasites. *P. vivax* was present in 27 *P. falciparum* in 22, and *P. malariae* in one.

The epidemic of meningococcal meningitis (see this Bulletin 1939 Supp. p. 129*) continued in rather sporadic form during 1938 and 285 cases were notified. Protective immunization and the intensive work on housing in various areas contributed largely to the decreased incidence of the disease. Hospital in-patients numbered 243 with 79 deaths. Among the 278 specimens of cerebrospinal fluid received at the Laboratory meningococci were identified in 121 cases. In 18 pneumococci were present this unusual occurrence is being investigated.

Notified cases of typhoid fever numbered 621 and deaths 54. The disease is being mainly transmitted by flies and this will continue until the rural population are equipped with fly-proof latrines. At present the majority of houses in rural areas use open yards and stables as latrines. The application of the Village Public Health Law should serve to bring about improvement in these matters. Meanwhile the usual measures of control were applied and the T.A.B. programme of inoculation continued. Hospital in-patients numbered 209 distributed as to 203 cases of typhoid (15 deaths) and 6 non-fatal cases of paratyphoid. At the Laboratory 643 samples of serum were tested and 84 *Bac. paratyphosum B*, 40 *Bac. paratyphosum A*, and no *E. histolytica* were reported. hospital in-patients numbered 15 and of these 14 were bacillary infections. Though 89 faecal specimens were examined at the Laboratory no ova were found and no *E. histolytica* were present.

Pulmonary tuberculosis was responsible for 183 notified cases. Hospital returns show that 19 in-patients and 224 out-patients were treated for the disease and that other forms of tuberculosis accounted for 81 in-patient and 307 out-patient cases. Interest and work were well maintained at all treatment centres. Admissions to the Athalassa Sanatorium numbered 88, treated 136, discharged 45 and deaths 41.

At the Dismouth Dispensary, Larnaca and the Philip Dispensary, Vicosia 635 new cases were seen and of these 139 were found to be suffering from pulmonary tuberculosis. At the laboratory 711 specimens of sputum were examined, acid-fast bacilli being found in 209 in-patients (3 deaths) and 5143 out-patient cases of bronchitis 85 in-patient (non-fatal) and 340 out-patient cases of broncho-pneumonia and 129 in-patients (2 deaths) and 280 out-patient cases of other pneumonias.

During the year 11,238 cases of eye diseases of various kinds are said to have been treated, but according to another account the Travelling and Honorary Oculists attended 16,468 new cases. It is also said that 2,262 cases of trachoma were notified, but 3,196 patients appear to have been treated for this condition, and 14,703 cases are known.

Helminthic Diseases.—No cases of schistosomiasis were reported nor have snails been readily found as heretofore. Hospital returns show that 174 cases of ascariasis 29 of trachinosis and 135 of oxyuriasis were among the patients treated.

Leprosy—To the Leper Farm 18 patients were admitted, 6 were paroled and 3 died at the end of the year there remained 113 inmates under treatment.

Veneral Diseases—Once again attention must be called to the conflicting numerical statements appearing in the Cyprus Reports (see this *Bulletin* 1939 Supp. p 128* and p 131* and the present summary). It is said that at the five V D Clinics 4,348 patients were seen and that of these 1,725 patients were suffering from syphilis and 2,183 from gonorrhoea. On the very next page it is said that 4,186 cases of V D were treated though the classified data do not add up to 4,186 moreover the totals for syphilis and gonorrhoea in the tabular statement do not add to the totals stated. It is quite impossible from such irresponsible accounts for any reader to discover what work has actually been done in this field in Cyprus. At the Laboratory Wassermann tests were applied to 3,613 samples of serum 660 giving positive reactions also among 817 smears examined the gonococci was present in 241.

Among other diseases mentioned it is noted that though the Report states that cases of rheumatism among in patients decreased from 66 in 1937 to 58 in 1938 and from 1,009 out patient cases to 964 the classified returns show that during the year under review 105 in patients and 2,525 out patients were treated a very considerable increase over 1937 experience. In point of fact the figures relating to cases of chronic rheumatism were completely ignored. Nephritis is not mentioned in the text of the Report all forms of the disease were responsible for 77 in patient and 833 out patient cases. Influenza accounted for 3,736 cases among in and out patients.

Scientific—The Report of the Government Pathologist observes that 15,035 specimens of various kinds were received and examined reference has already been made in the preceding notes of some of these and of the findings recorded. The Government Chemist reports that 1,043 samples were received and analysed only 35 were received from non-official sources.

Other Special Reports presented as Appendices to the Report under review included the following—

- (1) Report of the work of the Rockefeller Foundation in Cyprus —
 - (a) Malaria Report
 - (b) Engineering Report—Malaria Control.
- (2) Report of the Surgical Specialist
- (3) Report of the Honorary Social Worker

Financial—Total expenditure on Medical Department Services during 1938 amounted to £61,941 a sum which represents 6.8 per cent. of the total expenditure of the Colony during the same period.

GIBRALTAR (1938)

Gibraltar consists of a long mountain block (the "Rock") rising to a height of 1,896 feet 3 miles long and $\frac{1}{2}$ mile broad joined by a low sandy isthmus to the southern extremity of Spain. The town is built on the western and southern alides of the Rock facing the Bay of Algeciras the northern and eastern faces are inaccessible cliffs.

Vital Statistics—The Police estimate of the resident population at the end of the year was 20,239 comprising 17,222 British subjects

and the remainder aliens. *Registered births* numbered 363 and *deaths* 278 the resulting crude birth and death rates being 21.1 and 13.7 per 1 000 respectively. *Infant deaths* numbered 27 and the infant mortality rate 74.4 per 1 000 births.

The *Medical Staff* during 1933 comprised a Senior Medical Officer (Dr J. E. DRAKE) and 10 Medical Officers.

Maternity and Child Welfare Work.—To the Maternity Department of the Colonial Hospital 276 expectant mothers were admitted and 250 live births were recorded. Registered midwives attended 136 births. Two *pauper midwives* continued their training at the Colonial Hospital. fortnightly meetings continued to be held at the *Child Welfare Centre* where an average attendance of 103 was recorded (see this *Bulletin* 1933 Supp. pp. 132-133*). During the year 184 children were treated in the Children's Ward of the Colonial Hospital free of charge. The *Nursing Sister* paid 18 visits to the homes of children were paid by the Nurse during the year.

School Hygiene.—The *Nursing Sister* paid 18 visits to schools and recommended 173 children for medical and 118 for dental treatment. The *School Clinic* for these children continued to function at the Colonial Hospital and 145 of the 173 children recommended for medical treatment were dealt with. The *School Dentist* attended 814 children and continued his voluntary lectures at the Schools. The *Soup Kitchen Services* continued to function as previously described.

Public Health Sanitation etc.—Methods of *sewage and refuse disposal* remain as described in previous issues of this *Supplement*. As regards *water supplies* it is reported that the new reservoir was completed and brought into use during the year and that work on another new reservoir was commenced. In advance of the passing into law of a *Housing Ordinance* the City Council have commenced the erection of a block of tenements while plans and schemes for other tenements have been prepared (see this *Bulletin* 1933 Supp. pp. 132-133*). The routine inspection of *foods and drinks* was carried out as usual, as regards milk supplies the City Analyst reports that 40 per cent of the samples received were below the statutory limits in fat non-fatty solids or both.

Port Health Work.—During the year 5 091 ships called, the Port Medical Officer carried out 67 medical visits and 144 cases of sickness were landed from British and 25 from foreign ships. Upwards of 10,000 rats were destroyed. 118 were examined at the Laboratories but none was found to be infected with *Port Fever*.

Hospital Dispensaries etc.—(See this *Bulletin* 1933 Supp. p. 134*). In-patients admitted numbered 1,689 treated 1 785 and hospital deaths 108 and out-patients totalled 12,754.

During the year 856 cases of *infectious diseases* were reported. An epidemic of *measles* was responsible for 508 cases of which 454 occurred during the first three months. *Fifth disease* (Erythema Infectiosum) gave rise to 114 cases. This disease has been added to the list of notifiable diseases. Of *diphtheria* there were 15 cases with one death. A large number of swabs examined at the Laboratory showed 23 new cases of the disease. The City Council approved the issue of anti-diphtheritic serum free of charge to all doctors requiring its use. Only one case of *cerebrospinal meningitis* appears in the Returns but the Laboratory Report observes there were three cases of *Meningitis* due to the *meningococcus* and one case was due to *streptococcus*. Other

notifiable diseases reported (other than those mentioned below) included 102 cases of *chickenpox* 20 cases of *scarlet fever* and 50 cases of *German measles*

Of *pulmonary tuberculosis* eight cases were notified and 16 deaths were ascribed to this cause. Anti tuberculosis work was continued along lines previously described (see this *Bulletin* 1939 Supp. p. 135*). The Report of the Tuberculosis Officer describes the work in some detail. It was hoped to apply the *Mantoux Test* to a large proportion of the school-children in the Colony but parental permissions were received for only 75 cases of these 29 children reacted positively to the Test. Other respiratory diseases mentioned in the hospital returns include 44 non fatal cases of *bronchitis* and 39 cases of *pneumonia* with 8 deaths.

One case of *smallpox* was landed from the Bay and treated at the Isolation Hospital. During the year 403 primary and 350 re-vaccinations were performed.

Twenty-eight cases of *enteric fever* were reported and two deaths were ascribed to this cause. Six cases of *undulant fever* were notified neither routine nor special examinations of the goats supplying milk to Gibraltar revealed any infected animal. At the Laboratory where numerous human bloods were serologically examined 26 agglutinated *Bact. typhosum* H or O or both 9 *Bact. paratyphosum* B and 6 *Br. melitensis*.

Only one case of *dysentery* was reported. The Laboratory Report states that many stools were bacteriologically examined and that cases of bacillary dysentery were due to *B. dysenteriae* Flexner and the types encountered were Sonne and Polyvalent.

The Venereal Diseases Clinic at the Colonial Hospital continued to function as usual. 51 cases were treated and of these 37 were mercantile seamen. Hospital returns show 7 in patient cases of *syphilis* 12 of *soft chancre* and 27 of *gonorrhoea*.

Scientific—The City Analyst and Bacteriologist appends his usual report upon the laboratory work carried out during the year. Specimens examined totalled 5 776 and of these 1,593 were received from the Colonial Hospital. The principal specimens examined and findings recorded have been the subject of brief mention in the preceding notes. The Government Veterinary Surgeon discusses veterinary activities of public health importance.

Financial—Expenditure from Government funds on Medical and Sanitary Services during 1938 amounted to £24 193 a sum which represents 11.2 per cent. of the revenue of the Colony during the same year.

MALTESE ISLANDS (1938)

The Maltese Islands a group of islands in the Mediterranean Sea, are distant about 58 miles from the nearest point of Sicily 80 from Syracuse 142 from Reggio and 160 from the nearest point of the mainland of Africa. Malta itself is 17 miles long, 9 broad and has an area of almost 95 sq miles. Gozo 26 sq miles Comino and Pġiġa are mere islets the area of the former being about 1 sq mile. The whole group has about half the area of the Isle of Man.

Vital Statistics—Under this heading the data are tabulated in considerable detail—population by locality in three age groups

births and deaths according to local distribution, and deaths by sex in quinquennial and decennial age groups, and by cause with distinction as to age and sex, and by cause and seasonal distribution. The fundamental facts may be summarized as follows —

Item	Malta	Gozo	The Maltese Islands
Estimated Population	4,585	5,783	263,668
Registered births	7,906	733	8,704
Birth Rate per 1,000	32.8	28.6	32.4
Registered deaths	4,858	541	5,399
Death Rate per 1,000	20.0	21.0	20.1
Infant Deaths	1,778	181	1,857
Infant Mortality Rate	222.9	245.3	224.8

With the exception of 1930 the *infant mortality rate* for 1933 was the lowest recorded for many years.

Medical Staff—The Chief Government Medical Officer is Dr. A. V. BERNARD. The Report under review does not specify the numbers and grades of remaining Medical Officers employed the only information presented relates to promotions and appointments made during the year.

Maternity and Child Welfare Work—In an Appendix, Professor J. ELLUL, the Senior Accoucheur and Gynaecologist contributes a comprehensive and informative account of the work of the Maternity and Gynaecological Department of the Central Hospital. For purposes of the present summary it must suffice to say that 538 patients were admitted, 334 were delivered, 17 maternal deaths were recorded, and 269 babies were born alive. To the Gynaecological Wards 781 patients were admitted and 7 died in the out patient department 413 new patients were seen and 2,521 attendances recorded. The 16 *District Nurses* paid 6,083 visits to newly confined mothers in Malta and 982 in Gozo. Free midwifery assistance was granted to 610 mothers during their confinement and subsidies were given to two midwives to enable them to afford the inhabitants of outlying villages the facility of obtaining trained help in childbirth. The four *Infant Welfare Centres* maintained by the Mothers and Infants Health Association continued their useful work. Sixty-eight cases of *puerperal sepsis* with seven deaths were notified during the year.

The *training of nurses and midwives* is discussed in the section *Hospitals* below.

School Hygiene—The School Medical Staff remains unchanged (see this Bulletin 1933 Supp. p. 136*). During the year 25,264 children were examined—22,118 in Malta and 3,146 in Gozo. The number of newly admitted children showing signs of *under-nourishment* was larger but marked improvement was noted at later inspections especially among those who were given daily a free ration of milk. Of the 1,242 children suffering from dental caries Medical Officers complain that only 65 followed the prescribed treatment. During the year a scheme for the establishment of a *School Dental Service* was submitted to Government. *Trachoma* is however the disease to which the attention of School Medical Officers is directed. 200 cases were found in Malta Schools and 210 in Gozo. The number of children in schools treated for trachoma by District Nurses under the direction of Medical Officers

was 178 in Malta and 260 in Gozo and for cases of other *conjunctivitis* 262 in Malta and 23 in Gozo. The sanitary conditions of the schools were reported to be generally satisfactory though many are overcrowded. Lectures on hygiene and home nursing continue to be given to the senior girls in Elementary Schools but the extension of the teaching of hygiene in all schools is strongly recommended.

Public Health Sanitation etc—In an *Introductory Note* to the Report under review Dr A V BERNARD Chief Government Medical Officer contributes a concise account of general health conditions and of the principal features of the work of the Medical and Health Department during 1938. The state of the public health was on the whole satisfactory despite the prevalence of certain infective diseases. Since the establishment of the Medical and Health Department with effect from 1st November 1937 (see this *Bulletin* 1939 Supp p 137*) administrative efforts have been mainly concerned with the difficult task of co-ordinating the activities of the two former Departments and making of them one harmonious whole. During the year extensions continued to be made to the existing *sewerage* system. The system for the collection and disposal of *refuse* which has been extended to new areas continued to function satisfactorily. New legislative measures will enable the Public Health Department to enforce general or specific sanitary measures to check nuisances of various kinds. No mosquito-borne diseases occur in the Islands but *anopheles* have sometimes been found breeding and it is added that *Aedes aegypti* breeds in small collections of water in houses. Efforts to increase the general *water supplies* are being continued. The wholesomeness of piped supplies is satisfactory. In an Appendix details of the control exercised by the Department on water supplies are presented. Inspection of premises where articles of *food and drink* are kept prepared, or exposed for sale were regularly carried out during the year. Details of the inspections carried out by Sanitary Inspectors and of samples analysed and findings recorded are contained in four Appendices to the Report under review.

Measures taken for the spread of knowledge of hygiene and sanitation included lectures by Medical Officers and Sanitary Inspectors the distribution of leaflets exhibition of cinema films etc.

Training of Sanitary Inspectors—Arrangements are being made for holding a course of instruction for candidates for the post of Sanitary Inspector.

Port Health Work—The principal concern of the Port Medical Service is the prevention of the introduction of plague from countries where the infection has been prevalent within a few days or few hours' journey of Malta (see this *Bulletin* 1939 Supp p 138*). A detailed account of the year's work of this Service is contained in an Appendix from which the following data have been assembled—2 037 British and Foreign steamers and 475 sailing vessels entered Malta ports (1 189 of the steamers and 452 of the sailing vessels. Foreign). 47 ships arrived having or having had infectious disease on board and 20 cases of infectious disease were landed at Malta. Rats collected numbered 1 763 examined 1 631 plague infected nil. *Aircraft* arrivals were British 34 Foreign 231.

Hospitals Dispensaries etc—Good progress is reported in connexion with the building of the new Hospital. The overcrowding of the Central Hospital was somewhat mitigated by the judicious distribution of cases among other institutions. At all institutions in Malta

hospitals numbered 107. A full account of the work at these institutions is contained in special sections of the Report under review.

Veneral Diseases.—In an Appendix the Medical Officer in charge of the Venereal and Dermatological Department of the Central Hospital, contributes an account of the year's work, and from that account the following details have been extracted. In-patients treated for *syphilis* 22 *gonorrhoea* 25 and out-patients, *syphilis* 89 *gonorrhoea* 136 other V.D. 9. In addition to the above 68 old patients were under treatment for *syphilis* and 35 for *gonorrhoea*. A Commission from the British Social Hygiene Council visited Malta and carried out an investigation of the social hygienic situation in the Islands, thereafter submitting a comprehensive report which is receiving the consideration of the Government.

Scientific.—As Appendices to the Report under review two Laboratory Reports are presented. At the *Public Health Laboratory* 26,535 specimens of various kinds were received and examined; findings are recorded and discussed, some at considerable length. At the *Clinical Laboratory of the Central Hospital* 10,348 specimens were dealt with; the number and nature of the different specimens examined and findings recorded are classified in detail.

Financial.—The financial year covers the period April 1938 to March 1939: expenditure during this period—structural and maintenance works not included—totalling £221,538, a sum which represents 16.4 per cent. of the total expenditure of the Government for the year 1938–1939.

INDIAN OCEAN

ADEN (1938)

The volcanic peninsula of Aden is situated on the southern coast of Arabia and lies on the Red Sea trade-route between Europe and the East. The Colony of Aden has an area of 77 square miles and consists of Aden proper (area 21 sq miles) Little Aden (area 15 sq miles) a flat strip of coast about three miles broad (area 39 sq miles) and *Perim*.

Introductory—In 1935 the administrative control of Aden was transferred from the Government of India to that of the Colonial Office and from 1st April 1937 Aden assumed the status of a Crown Colony. The year 1938 was therefore the first complete calendar year of colonial administration in Aden and the Report under review is therefore the first Annual Medical Report submitted in Colonial form.

Vital Statistics—The details presented in the Annual Medical Report are abstracted from the annual report of the Medical Officer of the Aden Settlement. The total civilian population of the Colony is that enumerated at the census of 1931 and is given as 45 992 of this total 28 729 were *Arabs* 5,222 *Indian Mohammedans* 4 177 *Somalis* and *Sidis* 4 120 were *Jews* and 2 614 were *Hindus* only 252 *Europeans* were enumerated. Since 1931 the population has increased considerably and during the year under review a great influx of indigent people from the hinterland is reported. The census population was used for the calculation of crude birth and death rates for 1938.

Vital Registration—Under former Aden Settlement rules all births were held to be compulsorily notifiable by the head of the family but this requirement was only loosely observed by the mass of the people. During a smallpox epidemic in 1929 greater accuracy in birth registration became essential in order to enforce primary vaccination and in these circumstances birth notification was entrusted to female vaccinators and mosquito over-seers. Results proved eminently satisfactory and the system has continued to the present day. With regard to *death registration* as no corpse can be disposed of until a burial permit has been issued, registration of the *fact* of death can be regarded as reasonably complete though the causes of mortality are not accurate.

Registered births during 1938 numbered 1,891 and *deaths* (including stillbirths) 1 533. The birth rate (calculated on the 1931 census population) was 41.1 and the death rate (exclusive of stillbirths numbering 144) would have been 30.2 per 1 000.

Infant deaths numbered 315 and the *infant mortality rate* for the year under review was 166.6 per 1 000 live births.

The Medical Staff of the Medical Department comprised the Senior Medical Officer (Dr J. C. R. BUCHANAN) 11 Medical and Assistant Medical Officers and a Lady Medical Officer. Steps are being taken to increase the existing staff.

Maternity and Child Welfare has progressed slowly during past years but in 1938 special attention was devoted to plans for the extension of this important branch of medical work. It was recommended that half the total funds collected in commemoration of the centenary of the British occupation of Aden (1839) should be devoted to the building and equipping of a Maternity and Child Welfare Centre in Crater. It was also suggested that an appeal for assistance from the Colonial Development Fund should be made and if this proved successful it

coolies workshop and wharf coolies salt work coolies and casual labourers. Practically all the labour comes from the interior of Arabia.

A survey of *nutritional conditions* revealed the extent of under feeding amongst the poorest classes. Despite the large numbers of goats and cows in the Colony the consumption of milk is low. The manufacture and exposure for sale of foods and drinks are subject to regular inspection.

Port Health Work—The health work of the port is administered by the Senior Medical Officer. An Assistant Medical Officer supervises the routine work. The prosperity of the Colony depends almost entirely upon the existence of Aden as a first-class port which because of its proximity to ports which are seldom free from the major infectious diseases demands the closest medical supervision. The greatest care is therefore exercised by the Port Health Authorities on all ships arriving and passengers disembarking at the port. During the year under review 2 182 ships and 1 609 dhows entered and cleared the port. 21 infected ships were inspected and 3 cases of *smallpox* and one case of *chickenpox* were landed and treated at the Infectious Diseases Hospital.

Aden has so far had little regular *air communication* with other countries. Provision has been made for the control of all aerial traffic to or from the Colony.

Hospitals Dispensaries etc—The various institutions available for the treatment of sick persons may be divided into (a) Government and Settlement Institutions and (b) Private Institutions. The Government institutions comprise General and Infectious Diseases Hospitals a Mental Hospital a Leprosy Hospital, and three *Dispensaries*. The year's work at these Institutions may be summarized as follows—

Institution	Beds	In-patients	Out patients
European General Hospital Aden†	34	229	2 001
Civil Hospital, Crater Aden	200	2 137	19 140
Infectious Diseases Hospital Meala	140	—	—
Sheikh Othman	20	32	—
Mental Hospital	7	24	—
Meala Dispensary	—	—	3,924
Sheikh Othman Dispensary	—	—	9,869
Pedim Dispensary	2	6	505

† Provision is made for the isolation and treatment of the major infectious diseases occurring in Europeans in a small self-contained block of 4 beds.

The systematic *training of subordinate personnel* is to receive special attention with a view to effecting improvement in this direction.

The Private Institutions comprise the *Keith Falconer Mission Hospital* (100 beds) at Sheikh Othman and two charitable *dispensaries*. The Keith Falconer Hospital renders extremely valuable services to the Colony and with the exception of a Government grant of Rs. 3 000 is entirely supported from mission funds. During the year 1 413 in-patients and 4,809 out patients were treated.

The *Bas Jerbas Charitable Dispensary* which is supported entirely by Messrs. Covasjee Dinshaw and Bros. treated 10 229 out patients.

The *King Edward VII Charitable Dispensary* is supported by public

would be possible to include accommodation for in-patient labour cases in the Civil Hospital there is a modern maternity block which has still to achieve popularity among the native Arab population. A slow increase in the number of labour cases dealt with is reported, 68 women being delivered of their babies during the year. In addition the *nurse-midwife* attends patients in their own homes and she treated 28 cases during the year.

Infant welfare work is rapidly increasing in the Clinic supervised by the Lady Doctor at the Civil Hospital. During the year 126 ante-natal and 170 infant welfare cases were dealt with. It is said that at present the work reaches only the population of the Crater section. The Keith Fakoner Mission also treat children at their dispensary at Sheikh Othman but the Medical Department hopes to extend its own services to this area where many poor and backward natives reside.

School Hygiene—Though a system of school inspection was instituted in the former Aden Settlement, in recent years it has been difficult for the Medical Officer of Health to find time for the examination of school-children. During 1933 the work was continued by an Assistant Medical Officer mainly to obtain anthropometric data and to provide a means of assessing the general state of nutrition. No details of these examinations are supplied.

Public Health Sanitation etc.—The state of the public health is assessed on the basis of the returns of in and out patients treated in hospitals. These returns deal with a population comprising large numbers of people who are not permanently resident in the Colony, yet there is no practicable system of recording which would enable distinctions to be made between residents and non-residents. The Medical and Sanitary Services of the Colony are therefore called upon to care for more than the predominately urban population who are permanent residents. It is hoped therefore that a medical service in the Protectorate may be formed and linked with that of the Colony so that more accurate assessments can be made of the state of the public health in Aden and in Southern Arabia.

Anti-mosquito work is carried out in the Township area by a staff of mosquito officers who regularly inspect all possible breeding places which are brought under control by filling cisterns etc. The local anopheline is *A. culicifacies* which breeds freely in catch pits, brackish garden wells and in seepages which are sometimes up to saturation point with brine. Anopheline breeding is said to be practically non-existent in the urban division of Crater and Steamer Point but *Culex* and *Sigomyia* larvae are among those commonly found. The mean *Aden* index for the year was 0.31.

Conservancy work in Aden has reached a satisfactory standard of efficiency. Night soil and refuse are disposed of by incineration and village water is drained to the sea in all divisions except Maala where soakaway pits are in use. A water-carriage system to individual septic tanks is being installed in the more modern houses. New public latrines are constructed regularly. The general sanitary improvements have reduced the fly nuisance very considerably. The only mention of water supplies appearing in the Report under review observes that the town supply is bacteriologically pure. Under the heading of *labour conditions* it is said the number of labourers has increased since the census of 1931 when 3,619 of these workers were enumerated. *Housing* and other conditions vary with the type of employment which falls into four classes, viz. coal and cargo

coolies workshop and wharf coolies salt work coolies and casual labourers. Practically all the labour comes from the interior of Arabia

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personnel. The medically qualified staff would appear to comprise a Director of Medical and Sanitary Services (Dr S. T. GUNASEKERA), two Assistant Directors (one Medical, one Sanitary Services), 3 Senior Medical Officers, 330 Medical Officers (of various grades and including Specialists) and 5 Lady Medical Officers.

Maternity and Child Welfare Work continues to be popular and was carried out at 311 centres as compared with 207 centres in 1937. At these centres 9,485 clinics were held, attendances of expectant mothers totalled 78,108 of infants 157,988 and of pre-school children 75,177. There were 5 Lady Medical Officers in 1937. Five new Hospitals were built during the year so that 79 Government Maternity Wards were built with 507 beds. Other hospitals took in maternity cases though not provided with separate maternity wards. At the *De Soyza Lying-in Home* there were 166 beds and 8 maternity homes with 68 beds were maintained by Urban District Councils. Government provided the services of 271 trained midwives in addition 289 were employed by local authorities and 170 by estates. Registered midwives in the Island numbered 834. The training of midwives continues. 60 candidates were selected for training during the year and 66 who had completed the course at the Lying-in Home were assigned for training in Child Welfare work increased in number from 80 to 102.

School Hygiene—Health work was carried out in 3,461 schools 94,648 school-children were medically examined, and defects recorded averaged 2.3 per defective child. The results of these examinations are presented in great detail but for present purposes it must suffice to state that the principal defects included hookworm 31.7 per cent, teeth and gums and dental caries 15.2 per cent, malnutrition 12.1 per cent, anaemia 7.9 per cent. Schools continued to be visited for hookworm treatment. T.A.B. inoculation anti-smallpox vaccination, etc. while school health education received greater attention, interest, and support.

Public Health Sanitation, etc.—The Malaria Control and Health Scheme continued to operate the work of all groups functioning on the basis of the Health Unit as described in previous Annual Reports, and names of this Supplement. The reader is referred to the comprehensive account of the year's work in the Report under review. Special attention was devoted to the disposal of excreta and the control of soil pollution. Good progress was reported in latrine construction, 27,244 latrines being built during the year. Piped water supplies are provided to 39 out of 130 towns in the Island and in the provision of protected supplies 61 new public wells and 746 private wells were constructed, and improvements were carried out on 3,735 existing wells. Water investigations, soil surveys, etc. continued to be carried out by the Division of Sanitary Engineering and the bacteriological and chemical examination of samples of water was carried out as usual at the Laboratories.

The sanitary conditions on Estates are discussed at some length. During the year 728 estates were inspected and the results of these inspections commented upon under such headings as sanitation, line construction and accommodation, water supplies, etc.

A *Valuation Department* commenced work in February, 1938. Some 4,000 children were examined for signs of malnutrition. 1,500 children were given an exhaustive examination which included heights, weights

and the *A.C.H. Index* and an attempt made to correlate low indices with various signs of malnutrition. The work also included lectures on nutrition and dietics propaganda, the study of hospital diets and research work concerned with fermented milk calcium metabolism etc.

Sanitary inspections of private premises and of establishments engaged in the preparation and sale of *foods and drinks* continued to be carried out as usual. The *training class for Sanitary Assistants* completed a course in March and 31 out of the 40 candidates were successful at the local examination of the Royal Sanitary Institute. A new course with 35 students commenced in September. Two training classes for *Public Health Nurses* were conducted during the year.

Port Health Work—This continues to be carried out along lines described in previous issues of this *Supplement*. During the year 2 709 British and Foreign vessels and 227 Indian sailing craft were dealt with at the Port of Colombo and at the 15 minor ports 634 steam and 1 892 sailing vessels called. Sixty two vessels arrived in Colombo with 147 cases of infectious diseases (non-quarantinable) on board 7 of these being isolated ashore. A report on the Mandapam and Tataparai Camps is to appear in the 1938 *Administration Report of the Quarantine Department*. Anti plague measures continued to be energetically applied in port areas and a rat flea survey was carried out in warehouses lighters etc. by the Colombo Municipality.

The first *acrobplanes* arrived at the Colombo Airport in January. During the year 224 mail planes and one private plane alighted with 80 passengers and 268 members of crews. Aircraft regulations modelled on the International Convention for Aerial Navigation have been drafted and await sanction.

Hospitals Dispensaries etc—Four new Cottage Hospitals were opened during the year. According to the classified returns there are 115 hospitals with a total accommodation of 10,282 beds. To these institutions 348 604 patients were admitted 359,848 were treated and 20 167 died. Central and branch *dispensaries* maintained by Government numbered 415 and *visiting stations* 303. special institutions and clinics also provided out patient treatment. Government dispensaries and out patient departments recorded 5,895,205 patients who made 8 990 695 visits for treatment. The work carried out at the Colombo and Out-station Hospitals and at Special Institutions is reported in some detail after the manner described in previous issues of this *Supplement*. The most prevalent diseases amongst hospital in-patients were *malaria ankylosomiasis intestinal disorders respiratory affections rheumatism affections of the skin and influenza* these causes also figured prominently in the returns of out-patients.

At the *Nurses Training School* it is hoped to start a three years course of training early in 1939. meanwhile the training of nurses and midwives continued at various hospitals in the Island.

Medical Education is briefly referred to in extracts taken from the Registrar Ceylon Medical College, and which presents detailed figures relating to the work of the College for the academic year 1937-38.

The brief summaries which follow endeavour to epitomize the detailed accounts in the Report under review of the principal references to morbidity experience in Ceylon during 1938.

The incidence of *malaria* showed no increase in many localities it was below the normal for the preceding five years and this suggests that the Island wide organization established as the result of the 1934-35 epidemic has functioned well. *Malaria* is, however the most

Government to provide adequate health services for the population at large

Financial—Expenditure on Medical and Sanitary Services for the year ending September 1938 amounted to Rs. 12,079 168 as compared with the Budget Estimate of Rs. 12,144,592. Actual expenditure represents approximately 10 per cent. of the total revenue of the Island for the same period

MAURITIUS (1938)

Mauritius an island in the Indian Ocean, is distant 500 miles from Madagascar 834 from Seychelles, 1,300 from Natal and 2,300 from the Cape of Good Hope. It has an extreme length of 39 miles north to south and 29 miles extreme breadth east to west. Its area is about 720 sq. miles, equal to that of Surrey.

Vital Statistics—The data continued to be presented for each of the nine Districts in the Colony. The mid-year population for the year under review was 402,112. Registered births numbered 13,420 and deaths 12,046 the resulting crude annual birth and death rates being 33.4 and 29.9 per 1,000 respectively. The Indian population contributed the majority of the births and deaths. Infant deaths numbered 2,181 giving an infant mortality rate of 162.5 per 1,000 births (see also this Bulletin 1939 Supp. p. 150*).

The Medical Staff during 1938 comprised a Director of Medical Services (Dr. J. BALFOUR HIRN), a Deputy Director of Medical Services and 24 Medical Officers—the latter including Specialists and District Medical Officers.

Maternity and Child Welfare Work—The Maternity and Child Welfare Society and the Goutte de Lait continued to function as previously described. Government midwives paid 4,100 visits to the homes of expectant mothers and conducted 790 confinements. Hospital returns show that 1,521 women were treated at hospitals for diseases of the puerperal state, 1,098 confinements were conducted and 64 women died. In the Colony at large 167 deaths were registered as due to this group of diseases.

Public Health Sanitation etc.—In an Appendix to the Report under review anti-malarial activities confined to the central zone of the Island, are described at some length. Major anti-mosquito works in the region have been completed and attention is now principally occupied in dealing with minor nuisances. Methods of sewage and refuse disposal remain as described in previous issues of this Supplement and there is no change to record in the water supplies of the Colony during the year (see this Bulletin 1936 Supp. p. 142* 1937 Supp. p. 147* and 1938 Supp. pp. 151–152*). The general health of the labouring classes is reported to have been about the average.

The training of sanitary personnel was continued during the year for sanitary posts were under instruction during the year. Port Health Work—The Port Sanitary Authority reports that 237 vessels entered and that 23,111 members of ships' crews and 4,079 passengers were examined. Vessels arriving from infected ports numbered 114. The Medical Officer of Health, Port Louis describes anti-plague precautions etc. in and near the harbour area.

Hospitals Dispensaries etc.—No change is recorded in the numbers or distribution of hospitals in the Colony. In-patients treated numbered

28 605 (28 137 admitted during the year) and 1,532 hospital deaths were recorded. New cases treated at *hospital out-patient departments* and *dispensaries* numbered 250 236 and 365 449 attendances for treatment were recorded.

Great difficulty is still experienced in finding suitable recruits for the *nursing staffs* of hospitals.

There are 39 *Estate Hospitals* in the Colony no details are supplied of the work carried out at these institutions.

It is reported that in the rural districts the principal causes of admission to hospitals were *malaria* *ankylostomiasis* and *respiratory diseases* and that *pneumonia* and *malaria* were noteworthy causes of death in hospitals. Other references to morbidity and mortality experience during 1938 are summarized in the notes which follow.

No unusual features characterized the *malaria* situation during 1938. Patients admitted to hospitals suffering from this cause numbered 2,814 those treated numbered 2 850 and 90 hospital deaths were recorded. The distribution of types of infection among hospital in patients reads *benign tertian* 1 616 *quartan* 145 *subtertian* 39 *cachexia* 491 *blackwater fever* 38 and unclassified 521. *Out-patient* cases numbered 45 187 and of these 4,894 were cases of *malarial cachexia* 8 of *blackwater fever* and 40,295 cases were unclassified. Deaths due to malaria in the Colony as a whole totalled 2 302. The Annual Report of the Malaria Branch is presented as an Appendix to the Report under review.

No case of *plague* or *smallpox* was recorded. 11 109 children were vaccinated during the year. Nineteen cases of *diphtheria* were notified. 13 cases were treated as hospital in-patients with 3 deaths.

A widespread outbreak of *influenza* was responsible for 726 deaths. Hospital admissions numbered 1 131 hospital deaths 37 and there were also 32,590 out-patient cases. *Erysipelas* was responsible for 85 notified cases and 10 deaths.

Cases of *deficiency diseases* treated in hospitals were *beriberi* 31 *pellagra* 3 and *ricketts* 2. In addition 24 out patients were treated for *beriberi* 4 for *pellagra* 11 for *ricketts* and 165 for *undetermined avitaminosis*. In another section of the Report it is said that a special investigation revealed 95 cases of *beriberi* in Plaines Wilhems and Port Louis. It was thought probable that the Mauritius cases were due to accidental contamination of soya bean oil.

Deaths in the Colony due to *tuberculosis* numbered 327. Hospital returns show that among 553 cases of *tuberculosis* treated as in-patients with 72 deaths 469 of the cases and 65 of the deaths were due to the *pulmonary* form of the disease while among 1 654 *out-patients* treated for all forms of *tuberculosis* 1,359 were *pulmonary* in type. *Pneumonia* caused the deaths of 1 453 and *bronchitis* of 559 persons during the year. Hospital in patients treated for *bronchitis* numbered 894 (47 deaths) and for *pneumonia* 488 (206 deaths) while out-patients numbered 5,257 and 513 respectively.

During the year 63 cases of *enteric fever* were notified. 31 of these notifications were received in the Plaines Wilhems district where sanitation is on the whole better than elsewhere (see this *Bulletin* 1939 Supp. p. 153*). Among the 54 cases treated in hospitals (with 13 deaths) 51 were cases of *typhoid fever* and among outpatients were two cases of the disease. *Dysentery* was responsible for the deaths of 482 persons in the Colony. It is said that out breaks of bacillary dysentery occur from time to time and that these have the general

characteristics of water-borne infections. On the other hand the hospital returns show that the amoebic type of the disease appears to be more prevalent, for among in-patients were 555 amoebic cases, 208 bacillary and 61 undefined, the corresponding figures for out-patients being 2,470, 434 and 1,047 respectively. Diarrhoea and enteritis caused 1,325 deaths during the year. 687 in-patients and 8,409 out-patients were treated in hospitals and dispensaries totalling 23,218 and 75 hospital deaths were ascribed to this cause. Routine mass treatment in rural areas is still necessary since the people have not yet acquired the habit of using the latrines with which their premises are provided. The Annual Report of the Hookworm Branch describes the year's work. There is no change to record in the situation regarding schistosomiasis for no work was possible during 1933. Classified returns also show 137 in-patient and 8,231 out-patient cases of ascariasis.

Only one new case of leprosy was discovered during the year. The work of the Leprosy Board and Leper Hospital is described in detail in an Appendix to the Report under review. Fifty-three lepers were under treatment in the Leper Hospital, 7 died, and 7 were discharged. A statement shows the type of leprosy progress etc. in each case remaining under treatment at the end of the year.

Sexual Diseases.—In-patients treated for syphilis numbered 221 for soft chancre 184 and for gonococcal infections 203 the corresponding figures for out-patients being 852, 459 and 871 respectively.

Scientific.—The usual report of the Bacteriological Laboratory appears to have been omitted from the Report under review (see this Bulletin 1939 Supp. p. 155*). The Report of the Hookworm Branch supplies the numbers of stools examined and findings recorded, while the Report of the Malaria Branch contains details of blood examinations and positive findings.

The Special Reports presented as Appendices to the Report under review include the Report of the Government Medical Officer Rodrigues, Annual Report of the Hookworm Branch, Annual Report of the Malaria Branch, Report of the Medical Officer of Health, Port Louis, Annual Report on the Mental Hospital, Annual Report on the Leper Hospital, Report of the Radiologist, Annual Report on the Leprosy Hospital, Report of the Medical and Sanitary Services during 1938 amounted to Rs. 1,534,829 a sum which represents 9.2 per cent of the revenue of the Colony for the financial year 1937-38.

SEYCHELLES (1938)

The Seychelles Islands, 82 in number are situated in the Indian Ocean between 4 and 10° S latitude. Their total area is estimated as 156 sq miles. Mahé the largest, is 17 miles long and 3 to 7 broad with an area of 56 sq miles.

Statistical.—The estimated population at the end of the year was 31,488. Registered births numbered 831 and deaths 397, the resulting crude birth and death rates being 26.4 and 12.6 per 1,000 respectively. Infant deaths numbered 78 and the infant mortality rate 91.5 per 1,000 live births. Neither the numbers of the general European population nor of European Officers are supplied among the former group 2 deaths

were recorded and among the latter 1 051 were treated at Headquarters in Victoria (officials treated in the districts by Medical Officers are *not* included) [The numbers of officials treated has shown a steady increase in recent years] The *Medical Staff* at the end of the year comprised the Senior Medical Officer (Dr E. M. LANIER) and four Medical Officers and one Dental Surgeon

Maternity and Child Welfare Work—To the Maternity Section of the Seychelles Hospital 361 patients were admitted 374 were treated and 244 live births, 11 stillbirths and 3 infant deaths were recorded. There were no maternal deaths. At the Cottage Hospital Praslin the 43 patients dealt with in the Maternity Section included 38 labour cases. *Ante natal* and *Infant Welfare Clinics* continued to be held three times a week at the Seychelles Hospital 92 women and 1 130 children attended for treatment during the year. A certified Midwife and Nurse who acts as Lady Health Visitor makes periodical visits to the homes of expectant mothers and ailing children in central and rural districts. To deal adequately with this work additional assistance is required.

School Hygiene—Medical Officers of the Department carried out periodical examination of the children attending grant in aid or Government-controlled schools in Mahé. No details of the results of these examinations are supplied but it is stated that about 30 per cent. of the children showed signs of deficient nutrition and development over 75 per cent had clinical signs of intestinal parasites and a large proportion had enlarged or infected tonsils. The schools themselves were clean well ventilated and were found to have adequate latrine accommodation.

The children attending schools in Praslin and La Digue were individually examined and results recorded in some detail *helminthic* infestations *anaemia* and *malnutrition* *dental caries* and lack of cleanliness figure prominently among defects recorded.

During the year under review a new feature of first rate public health importance was seen in the appointment of a qualified *Dental Surgeon* whose principal duties will be concerned with school-children. A comprehensive report is contributed by the Dental Surgeon and presented as an Appendix to the Annual Report under review.

Public Health Sanitation etc.—It is stated that during 1938 the health of the population showed no special features and was on the whole good. The responsibilities of the Victoria Town Board and Local Boards of Health together with descriptions of methods of *sewage* and *refuse disposal* have been discussed in previous issues of this *Supplement* and as no changes are noted in respect to these matters further comment becomes unnecessary. With regard to *water supplies*—also described in previous issues of this *Supplement*—the Report under review refers in some detail to the three reservoirs supplying the principal sections of the town and suburbs and sources of supply to these reservoirs.

Dr E. M. Lanier Senior Medical Officer records the opinion that the general state of health of labourers on the outlying islands and their general living conditions are better than those of the average labourers in Mahé (see this *Bulletin* 1938 Supp p 158*)

The routine inspections of articles of *food* exposed for sale were continued as usual. The native dietary is generally deficient in protective foods—the consumption of milk, green vegetables and fruits is not general. On agricultural estates labourers are encouraged to

grow vegetables and fruits but so far there has been little response to this encouragement.

The training of sanitary personnel was continued three new probationer sanitary inspectors were engaged during the year under review.

Port Health Work—There is no change to record in the constitution and organization of the Port Sanitary Authority. During the year 61 vessels called at Mahé 621 passengers arrived and 610 passengers left the Colony. No ship was placed in full quarantine during the year. Once again attention is called to the fact that accommodation at the Quarantine Station at Long Island is inadequate and that buildings are in need of extensive repairs and improvements. The fulfilment of these needs is a matter of urgency having regard to the increasing number of passengers arriving in the Colony each year.

Hospitals Dispensaries etc—A new masonry building for the Cottage Hospital, Praslin, is nearing completion, and will replace the old wooden building at present in use. To all institutions 1,918 patients were admitted, 2,018 were treated and 69 died. Hospital out-patients numbered 5,144 (recorded for the Victoria Hospital only) and Dispensary patients 4,155.

Two imported cases of malaria were treated in hospital (see this Bulletin 1938 Supp. p. 159*). Local vessels trading between the Seychelles and neighbouring malarial countries are fumigated or disinfected before being allowed to enter the inner harbour. A small Clarton apparatus was installed in 1933.

No case of smallpox was recorded during the year. The compulsory regulation regarding vaccination continue to be applied (see this Bulletin 1938 Supp. p. 159*) and during the year 758 children were vaccinated by Government Medical Officers.

Six cases of tuberculosis with one death appear in the returns of the Seychelles Hospital. Five cases and the death were ascribed to the pulmonary form of the disease. On the other hand it is noted that in the Colony as a whole 10 deaths due to pulmonary tuberculosis and 5 to other forms of the disease were registered during the year. There were also treated in hospital 101 cases of respiratory affections and these included 12 cases of broncho-pneumonia (one death) 18 cases of bronchitis (one death) 3 non fatal cases of lobar pneumonia and 40 cases of asthma.

Of dysentery 35 cases were treated at the Seychelles Hospital (all of the amoebic type) with one death and 4 cases at the Cottage Hospital, Praslin. Other diseases of the digestive system treated included the following. At the Seychelles Hospital, 63 cases of diarrhoea and enteritis and 68 cases of appendicitis (one death).

Helminthic Diseases—Infestation with *ascaris* and hookworm remains widespread especially amongst children, with hookworm as a serious cause of ill-health. Mass treatments continue to be carried out regularly in the central and outlying districts.

Six new cases of leprosy were detected during the year and there are said to be 100 known lepers in the Colony. The outstanding event of the year was the opening in November of the new Leper Settlement for male lepers on the Island of Curieuse (see this Bulletin 1938 Supp. p. 160*) soon after the opening of the Settlement it was found necessary to provide additional accommodation. A Settlement for female patients is in process of construction.

There were 16 cases of leprosy in home isolation in Praslin and 3 in La Digue. At the Leper Camp at Round Island Praslin, there were 25 inmates. In November the male patients were removed to the Curieuse Settlement (see above) 7 more patients were then admitted to Round Island and the year closed with 30 patients in the Institution.

Veneral Diseases are said to be very prevalent and though facilities for treatment are available many cases never seek advice until complications have developed. V.D Clinics are held at the Seychelles Hospital at the Cottage Hospital, Praslin and at the established dispensaries. At the Seychelles Hospital 40 in-patient cases were dealt with.

Other diseases to which reference is made in the Report under review include the following —

A form of *hepatitis* usually with no previous history of amoebic dysentery is prevalent. At the Seychelles Hospital 76 in patients were treated for this condition. The high incidence of *diseases of the digestive system* is commented upon, and it is also stated that *diseases of the circulatory system* are common. Deaths from *cancer* in the Colony totalled 20.

Special Reports presented as Appendices to the Report under review include (a) The Annual Medical Report of the Assistant Medical Officer Praslin and La Digue and (b) The Annual Report of the Dental Surgeon. References to the contents of these Reports have been made in the preceding notes.

Financial — Actual expenditure on Medical and Sanitary Services during 1933 amounted to Rs. 89,219 as against an estimated expenditure of Rs. 85,328.

FAR EAST

BRITISH MALAYA (1938)

Introductory—The Report under review contains the Annual Reports of all Medical Departments in British Malaya (see this *Bulletin* 1939 Supp p 160*) and continues the practice of presenting numerous photographs illustrative of various phases of Public Health Work under the various Administrations. Officers of the *Malayan Medical Service* fill the higher posts in the medical and public health services of the Straits Settlements (exclusive of Municipal appointments) and the Malay States. The authorized establishment of this service (medical qualified personnel only) comprises—
A Director of Medical Services Straits Settlements and Adviser Medical Services Malay States (Dr R. D. FITZGERALD M.C.) A Deputy Director of Medical Services Straits Settlements. Nine super-scale Medical Officers *Grade A* and seven *Grade B*. Twenty-one Surgeons and Specialists (including Pathologists, etc.) A Principal of the College of Medicine Singapore and 8 Professors (Medical subjects). 81 Medical Officers 16 Lady Medical Officers, 2 Medical Superintendents and 2 Assistant Medical Superintendents (Mental Hospitals). In addition to the above locally appointed officers employed in various administrations include 155 Medical and Health Officers and 15 officers in special appointments, distributed as to 71 in the Straits Settlements, 59 in the F.M.S. and 40 in the Federated Malay States.

STRAITS SETTLEMENTS (1938)

The Colonies of the Straits Settlements, the collective name given to the Crown Colonies formed by the British possessions on or adjacent to the mainland of the Malay Peninsula, as opposed to the Federated and Unfederated Malay States consist of the island of Singapore with about a score of small islets lying in its immediate vicinity; the town and territories of Malacca, the Island of Penang and Province Wellesley and the island of Labuan. The total area is about 1,357 sq miles (Singapore 220 sq miles Penang and Province Wellesley 400 sq miles Malacca 640 sq miles) and Labuan, 35 sq miles.

Vital Statistics—The registration of Births and Deaths Ordinances (1937) came into force on the 1st of January 1938 (see this *Bulletin* 1939 Supp p 160*). The estimated population at the middle of the year was 1,343,403 distributed as to 15,142 Europeans and 12,027 others. Total births (all races) registered numbered 56,735 and deaths 28,559 the resulting crude birth and death rates being 42.2 and 21.3 per 1,000 respectively. The infant mortality rate was 151.5 per 1,000 live births.

Medical Staff see above
Maternity and Child Welfare Work—Government maternity hospitals continue to function as previously described (see this *Bulletin* 1939 Supp p 161). Deliveries in Government Hospitals numbered 11,206 and there were 141 maternal deaths. The maternal mortality rate for the whole of the Straits Settlements was 6.8 per 1,000 live births. The training and work of midwives continues along lines previously described in the pages of this Supplement in the Colony

in 1938 there were 404 Class A midwives 965 Class B and 280 Class C. The organization of *Infant and Child Welfare Services* remains unchanged (see this *Bulletin* 1939 Supp p 161*) There are 18 Government Centres and 23 sub-Centres engaged in providing infant welfare services in rural areas attendances at clinics numbered 222,864 and visits to homes 225 437 At the Municipal Clinics attendances numbered 65,253 and visits to homes 217,270 The *Women's and Children's Dispensaries* in the large towns dealt with 49 110 new patients and of these 23 737 were children.

School Hygiene—In Singapore 9 470 girls and junior boys and 9 652 boys (total 19 122) were examined and defects were found in 14,328 the principal defect being *dental caries* The physique of over 90 per cent of the male pupils was found to be good and among the girls a high standard of cleanliness in clothes and person was maintained. A severe outbreak of typhoid fever occurred among school-children in the Municipal area and traced to a carrier who lived in the house of a Chinese ice-cream manufacturer 20 schools were involved and 248 cases notified. General inoculation of school-children was undertaken and 38 545 inoculations were given In *Penang and Province Wellesley* 208 English and Vernacular Schools were visited and 12 525 boys and 4,356 girls were examined of the former 4 125 and of the latter 1,230 were recommended for treatment dental defects predominating In *Malacca* 128 schools were visited, and 11,330 boys and 1 460 girls were examined of the former 578 were recommended for treatment. A high percentage of dental defects was recorded especially among female pupils (see also this *Bulletin* 1939 Supp pp 161-162*)

Public Health Sanitation etc—Anti-malarial work in the various areas of the Straits Settlements continues to be described in detail the accounts being supported by several admirable photographs of various methods of drainage which have proved successful With regard to methods of *sewage and refuse disposal* (described in this *Bulletin* 1937 Supp p 167*) it is noted that in the rural area of Singapore the number of private water-borne sewage systems is increasing Progress is noted in steps being taken to provide adequate and safe *water supplies* In the Municipal area of Singapore gradual extension of the water main into the rural area was continued in Province Wellesley the construction of the Cherok To Kun Dam and impounding reservoir was satisfactorily completed, and the rearrangement of water mains to convey water to the central filtration plant was also completed. In *Malacca* a new filtration plant was installed. Supervision of *foods and drinks* and especially of hawkers and the foodstuffs they offer for sale was continued. Officers of the Health Branch of the Medical Department continued to visit *estates* and to submit their recommendations for improvements in hygiene and sanitation (see this *Bulletin* 1939 Supp p 163*) The average estate population in 1938 was 23 084 and the death rate 10.5 per 1 000

The *training of sanitary personnel* continued along lines previously described 10 private and 11 Government students attended the course and of the 21 candidates who sat for the examination 13 were successful Monthly meetings for all sanitary Overseers are held for the discussion of every-day problems by the Health Officer or Chief Sanitary Inspector

Port Health Work—Quarantine restrictions were imposed upon vessels arriving from ports in India Burma China, and Indo-China on

locally appointed officers there are 27 clinics and outdoor dispensaries providing treatment for venereal diseases, with special facilities for the treatment of seamen in the ports of Singapore and Penang. Cases treated at Government centres during 1933 were for syphilis 6,838 gonorrhoea 3,832, chancres 3,934 and combined infections 1,447 making a total of 18,201 cases (see also this *Bulletin* 1933 Supp. p. 166*). A comprehensive report of the work of the Social Hygiene Department is presented in the Report under review in which such matters as incidence, propaganda, etc. are discussed. New out-patient cases of years numbered 5,235 and there were also 39 admissions to hospitals for this disease.

Among other diseases mentioned in the Report the following may be cited. *Helmintic diseases* are not discussed in the text of the Report but the classified returns show that among out-patients there were 16,909 new cases of *ascariasis* 3,857 of *enterostomiasis* 108 of *arruiasis* and 4 of *discothiasis* admissions to hospitals for these causes being 19 782, 1,830 and 108 respectively. An appreciable increase in the numbers of cancer cases admitted to hospitals is recorded with 790 cases (238 deaths). Motor accidents were responsible for 909 admissions and 61 deaths. Influenza for 1,387 hospital admissions (21 deaths) and 8,798 new cases among out-patients and nephritis for 859 hospital admissions (189 deaths) and 1,768 new cases among out-patients.

Scientific—The year's work at the *King Edward VII College of Medicine* is described as usual. An entry of 20 medical 18 dental and 10 pharmacist students was recorded at the commencement of the academic year total students being medical 104 dental 62 and pharmacist 10. The new Dental Clinic building was completed and occupied in June 1933. It provides adequate accommodation and teaching facilities for the dental school. Teaching and research work in the various Departments are discussed at some length.

The Report of the *Pathological Branch* covers the activities of the Singapore Penang and Malacca Laboratories. The principal specimens received and examined, and findings recorded have been briefly referred to in various sections of the present Summary.

Financial—Expenditure on Medical and Health Services in the Straits Settlements during 1933 amounted to \$1,237,711 distributed as to Singapore \$2,545,314 Penang \$1,171,813 Malacca \$406,207 and Labuan \$24,377.

Penang, Straits Settlements.

MUNICIPAL HEALTH OFFICER'S REPORT ON THE HEALTH OF THE MUNICIPALITY OF GEORGETOWN PENANG 1933.

Vital Statistics—Information in considerable detail is presented in a series of some 16 Tables—birth death and infant mortality rates for each year from 1919 onwards are also graphically illustrated. A summary of the more important data would read as follows—

Race	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
European	1,351	52	38.5	5	3.7	3	58
Eurasian	2,274	31	13.6	14	6.2	0	—
Chinese	118,543	4,921	42.2	2,207	18.9	504	102
Malay	22,037	497	22.6	332	15.1	79	169
Indian	27,796	800	28.8	430	15.5	82	103
Others	2,037	40	19.7	23	11.4	2	50
Totals	171,688	6,341	36.9	3,011	17.5	670	106

From July 1938 all births other than those occurring at the Maternity Hospital had to be notified at the Municipal Offices within 14 days of occurrence. Deaths must be notified within 24 hours at the Municipal Offices, General Hospital, or at any Police Station.

In Table X of the Report under review deaths are tabulated by cause in 13 age-groups with sex distinction but the nomenclature used does not make comparability with mortality experience in other places easy. For example Parturition, Premature Birth, Childbirth and Abortion and Puerperal Fever are separate titles (responsible for 118 deaths) scattered among the nomenclature used, but in the International List these causes would appear under the title *Diseases of Pregnancy etc*. Another title is Debility accounting for 32 deaths but without distinction of the deaths occurring within the first year of life (*see Diseases of Infancy*).

The Medical Staff (European) comprises the Municipal Health Officer (Dr W H BRODIE) a Deputy Health Officer and an Asiatic Assistant Medical Officer.

Maternity and Child Welfare Work.—This work continued to be carried out throughout the year at the two established centres (see previous issues of this Supplement). After the first quarter of the year the services of the Lady Assistant Medical Officer in attendance at the two Welfare Centres was dispensed with but the Centres continued to function with two Nurses in regular attendance. Medical Officers and Health Sisters paid occasional visits. The Health Sisters continued to be responsible for the District work and supervision of the work of the midwives practising in the districts (see this Bulletin 1939 Supp. p. 169*). At the end of the year there were on the Midwives' Register 98 Class A, 310 Class B and 10 Class C. midwives.

Dr W H Brodie calls attention to the steady decline in the infant mortality rate and while recognizing the importance of maternity and child welfare activities reminds his readers that services devoted to effecting general sanitary improvements have also played an important part in this field of work.

Public Health, Sanitation etc—For all practical purposes services remain as described in the four previous issues of this Supplement.

Port Health Work—During the year 94 passengers arrived from infected ports and were kept under surveillance.

Hospitals Dispensaries etc—No details supplied. The notes which follow summarize some of the principal references to morbidity and mortality experience during the year under review.

Thirty two deaths were ascribed to malaria but it is stated that with a single exception all the deaths recorded were definitely traced to infection acquired outside Municipal limits. Certification of cause

STRAITS SETTLEMENTS —FEDERATED MALAY STATES

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of death of the exception was on clinical diagnosis only. The low incidence of malaria in the Municipal area (is said to be largely) due to the vigilance of the anti-mosquito gangs which are constantly at work. It is of importance to note that in addition to the 32 deaths definitely ascribed to malaria, there were also 410 deaths due to unspecified fever during the year (see also this Bulletin 1939 Supp. p. 109*)

Of the 63 cases of enteric fever notified 49 occurred among Chinese and 27 among Indians. 70 cases were treated in hospital with 24 deaths, and total deaths due to this cause in the Municipality numbered 39 the highest number so far recorded. The itinerant hawker of foods and drinks is again regarded as a responsible agent. It is hoped to introduce new regulations designed to deal effectively with the sale of food etc. The classified returns show also that 73 deaths were ascribed to diarrhoea 69 to enteritis and 28 to dysentery.

Tuberculosis as a cause of death takes second place (the first unspecified fever) in the list. During the year 330 deaths were ascribed to all forms of the disease and of this total 303 were due to pulmonary tuberculosis. Bronchitis was the cause of 184 pneumonic (all forms) of 125 and other diseases of the respiratory system of 240 deaths.

There were 37 cases of diphtheria and 18 deaths. 35 of the cases were Chinese. Only 23 cases were notified and of the 18 fatal cases only two were notified before death.

No mention of venereal diseases is made (see this Bulletin 1939 Supp. p. 170*) but 16 deaths were recorded as due to syphilis. Among other and frequent causes of death during the year under review were beriberi 34 deaths, cancer 63 deaths, diseases of the genito-urinary system 171 deaths and convulsions (under 5 years) 154 deaths.

The Report of the Chief Sanitary Inspector supplies detailed statements of the year's work of his Department. Among other matters it is noted that 4,810 primary and 140 secondary vaccinations were performed and that rat-catching gangs continue their work and destroyed upwards of 6,000 rats.

Financial.—Total expenditure on Municipal Medical Services during 1938 amounted to £174,633 or deducting revenue £161,423.

Municipality of Singapore (1938).
The Annual Medical Report for 1938 had not been received at the time of going to press on February 26th 1941

FEDERATED MALAY STATES (1938)

The Federated Malay States are situated on the mainland of the Malay Peninsula, closely connected with the Straits Settlements. They comprise four States: Perak, Selangor, Negri Sembilan and Pahang. The total area is 27,644 sq miles. The principal towns are Ipoh, Taiping, Kampar and Teluk Anson in Perak, Kuala Lumpur and Klang in Selangor and Seremban in Negri Sembilan.

Vital Statistics.—The estimated population at the middle of the year for each of the four States is presented with racial distinction, the number of births and deaths also with racial distinction are tabulated. For purposes of the present Summary limits of space allow only the classification of the following data:—

State	Population	Births	Birth Rate	Deaths	Death Rate	Infant Mortality Rate
Perak	938 421	37 492	39.9	17 003	18.1	146
Selangor	681 008	25 658	38.8	12,379	18.7	169
Negri Sembilan	281 089	10,923	38.8	5 714	20.3	149
Pahang	206,317	8 875	42.4	4 911	23.5	155
Totals	2 089,835	82,948	39.7	40 007	19.1	147.0

On Estates the total population numbered 277 108 distributed as to Perak 90 008 Selangor 108,354 Negri Sembilan 58 490 and Pahang 20 176

For details of Medical Staff see p 117 *supra*

Maternity and Child Welfare Work—Additional maternity accommodation was provided at the Kajang Hospital Selangor and at the Kuala Pilah Hospital Negri Sembilan. Elsewhere facilities remain for all practical purposes as described in previous issues of this Supplement. Maternity cases admitted to Government Hospitals numbered 11 610. The Chinese Hospitals continue to do excellent work at the Chinese Maternity Hospital Kuala Lumpur 4 283 deliveries were conducted with 15 maternal deaths and at other Chinese Maternity Hospitals in the F.M.S. nearly 4 000 labour cases were dealt with. Facilities are available at all hospitals for the training of midwives. Qualified Malay midwives are gradually replacing the untrained *bidans* in the Kampongs.

Infant Welfare Work continued along lines previously described. four new branch centres were opened in Pahang. Ante-natal work continues to expand. District visiting continues among Malays with successful results. While the value of maternity and welfare work cannot necessarily be assessed on the basis of recorded attendances some indication of the popularity of the centres is possible from the following figures: attendances at centres in Perak totalled 54 539 in Selangor 77,542 in Negri Sembilan 30 627 and in Pahang 32,437.

School Hygiene—Routine services continued to function as previously described. special attention is being given to the examination of school-children for the very early signs of leprosy. some of the Medical Officers concerned having undertaken a special course of training at the Leper Settlement Sungai Buloh. The commonest defects observed among school-children were dental caries skin and eye diseases splenic enlargement and pediculosis. A beginning has been made with the provision of dental treatment for school-children in every State. two dental officers were appointed for work in Pahang one in Selangor and one in Negri Sembilan.

Public Health Sanitation etc—The general state of the public health during 1938 was satisfactory. the crude annual death rate was the lowest recorded since 1932 and the birth rate the highest ever recorded in the F.M.S. Anti malarial measures probably the most important work of the health branch and of medical practitioners visiting estates, continued to be implemented energetically. the most intensive anti malarial work is necessarily limited to areas where population density is high. The Anti Malarial Enactment 1937 is enabling health authorities to extend control in rural areas. Methods of sewage and refuse disposal remain unchanged. With regard to water supplies it is noted that in Selangor work is in provision of piped

supplies to Kampongs along the Ulu Langat valley and that in Perak purifying plants for the treatment of river water have been provided under the enactment revised the powers under the enactment enable public health authorities to control the preparation and sale of foods etc. and to insist upon prescribed standards of purity and composition. The *asales and wines* continued to be inspected by health officers and health inspectors (see this *Bulletin* 1939 Supp. p. 177*) *Railway sanitation* is described at some length, and discusses the two main activities viz public health and anti malarial work, and the medical care of the railway staff. The *training of sanitary personnel* was continued probationary sanitary inspectors receive instruction from health officers in preparation for the course in Singapore for their departmental examinations.

Port Health Work—Ocean-going vessels entering and clearing (exclusive of native craft) 640 the Port Health Staff dealt with 36,525 passengers and 11 446 members of ships' crews. Forty four vessels arrived from infected ports with 3 125 aided immigrants and 6 438 ordinary passengers. 9,558 persons were admitted to the Quarantine Station. Forty four cases of leprosy were discovered, 43 among deck passengers. 40 of these lepers were repatriated. Vaccination and anti-helminthic treatment of immigrants was continued.

Hospitals Dispensaries etc.—The considerable amount of construction work carried out during the year included four new wards to the General Hospital, Ipoh (Perak) additions to the General Hospital, Kuala Lumpur the Sungai Buloh Lepet Settlement and two other hospitals in Selangor new wards to three hospitals in Negri Sembilan, and a hostel for nurses in Pahang. Figures of admissions to hospitals and attendances at dispensaries have increased some of the increase is attributed to the growing popularity of these institutions. Details of work at all treatment centres is presented in detail but for purposes of the present summary only the following data can be tabulated—

State and Centres	In patients	Hospital Deaths	Out-patients
<i>Perak</i>			
17 Hospitals	57,671	3 768	112,588
Stationary Dispensaries	—	—	103,247
Travelling Dispensaries	—	—	77 664
<i>Selangor</i>			
7 Hospitals	35,008	2,569	84,764
Stationary Dispensaries	—	—	114 160
Travelling Dispensaries	—	—	84 464
<i>Negri Sembilan</i>			
6 Hospitals	23 183	1 499	60,668
Stationary Dispensaries	—	—	28,736
Travelling Dispensaries	—	—	36,365
<i>Pahang</i>			
8 Hospitals	19,940	1 197	69 011
Stationary Dispensaries	—	—	13,853
Travelling Dispensaries	—	—	49 732

(See also this *Bulletin*, 1939 Supp. pp 177-178.)

Sections of the Report under review present details of the work of the specialist services e.g. *Surgery Dental Ophthalmology* etc. The principal diseases treated during the year are the subject of brief mention in the following notes.

The increased incidence of *malaria* was the outstanding feature of public health experience during 1938. It affected every State but was least severe in Perak. During the year 34 986 persons were admitted to hospitals and 966 died and in addition over 96 000 new cases were treated for malaria as out patients. The distribution of types of infection among in patients reads *subtertian* 17 747 *benign tertian* 8 549 *cachexia* 3 646 *quartan* 500 *mixed infections* 808 *black-water fever* 33 and unclassified 3 703. It is noted that in all four States 1 273 deaths were ascribed to malaria but 13 142 to *Fever of undefined origin*. At hospital Laboratories in the four States 362 138 blood films from 224,957 patients were examined. 23 448 contained *subtertian* parasites 15 014 *benign tertian* 795 *quartan* and 959 mixed infections.

There were no cases of *smallpox* but routine vaccination was continued. Among other infectious diseases *diphtheria* was responsible for 288 admissions to hospitals (92 deaths) and 37 out-patient cases *tropical typhus* for 278 admissions (19 deaths) and 3 out patient cases *influenza* for 8 727 admissions (21 deaths) and 46,872 out patient cases *cerebrospinal meningitis* for 4 admissions and 3 deaths *measles* for 372 admissions with 20 deaths and *whooping cough* for 77 admissions (6 deaths) and 1 769 out-patient cases.

A notable increase in the incidence of *beriberi* is recorded. There were 1,262 admissions to hospitals with 121 deaths, while deaths due to this cause in the F.M.S. totalled 353. It is said to be difficult to assess with accuracy the prevalence of the disease—greater interest in nutritional conditions and greater accuracy in diagnosis may account for increase in recorded cases. Making allowance for these factors a real increase in *beriberi* is evident. A nutritional survey carried out in a coastal district of Selangor revealed that in practically every household of Malay peasants there was evidence of Vitamin B deficiency.

Notifications admissions to hospitals and deaths due to *enteric fever* continue to increase. Hospital admissions totalled 431 and of these 409 were *Bact typhosum* and 22 *Bact paratyphosum* infections. Hospital deaths numbered 77 and deaths in the four States 87. *Dysentery* was responsible for 1,948 deaths in the F.M.S. during 1938. Hospital admissions numbered 1 478 (221 deaths) distributed as to 851 *amoebic* 335 *bacillary* 2 mixed and 290 unclassified infections. There were also 2 485 out patient cases. At the Hospital Laboratories where the stools of 142 062 patients were examined, 1 094 were positive with *E histolytica*.

All forms of *tuberculosis* were responsible for 1 499 deaths in the F.M.S. Of the 2 305 admissions to hospitals (928 deaths) 2 075 of the cases and 855 of the deaths were due to the *pulmonary* form of the disease. Among 454 out patients 400 were pulmonary cases. A preliminary *tuberculosis* survey was undertaken among school-children in Kuala Lumpur by the Institute of Medical Research and 3 336 children aged 6 and upwards were *tuberculin* tested. Chinese children showed a relatively high proportion of strongly positive reactors and the rate among Malays was higher than had been expected. All forms of *pneumonia* accounted for 3,379 hospital admissions 1 647 hospital

deaths, and 622 out-patient cases and bronchitis for 3,824 hospital admissions 135 hospital deaths and 71,893 out-patient cases.

According to the classified returns *Admission diseases* are a serious cause of disability there were upwards of 3 000 hospital admissions (*ascariasis* 1,500 *ankylostomiasis* 858) and over 60,000 new out-patient cases *ascariasis* accounting for 57,221 of the latter At the Hospital Laboratories where the stools of 142,062 patients were examined, 33 016 were positive for *Ascaris* and 13,868 for *ankylostome ova*.

Leprosy.—A separate section of the Report under review discusses the work carried out at the various Leper Settlements. Patients treated at the Sungai Buloh Settlement numbered 2,639 of which 492 were new and 210 re-admissions during the year 97 were discharged and 108 died. At the Leper Asylum Kuala Lumpur where a number of chronic incurable lepers are accommodated, there were 157 patients at the end of the year This special section of the Report discusses the racial and age distribution of leper patients type classification of cases, treatment and results of treatment, clinical research etc.

Veneral diseases.—Treatment is provided at hospitals and outdoor dispensaries there are few special clinics in the F.M.S. It is said that the 21 015 cases of venereal disease treated during the year comprised 11 115 cases of *syphilis* 7,364 of *gonorrhoea* and 2,536 of *soft chancre* (These figures do not agree with the classified returns in the Report) Altogether 5,227 V.D. patients were admitted to hospitals and these comprised 1,970 cases of *syphilis* 856 of *chancre* 2,163 of gonococcal infections 231 of *tropical bubo* and 7 each of *granuloma venereum*.

Although no mention of the disease occurs in the text of the Report it is noted that 210 persons were admitted to hospitals and 18 000 out-patients (new cases) were treated for years.

Among other diseases responsible for unusual disability the following call for mention—*rheumatism* hospital admissions 518, out-patients 17 005 cases various forms of *swarms* admissions 2,266 (349 deaths) out-patients 17,605 *eye diseases* admissions 2,679 out-patients 26 740 *asthma* 1,324 admissions 5 633 out-patients *nephritis* 692 admissions (196 deaths) 1 707 out-patients and *ulcers* 3,271 admissions and 62,084 out-patients. It should also be observed that patients admitted to the Central Mental Hospital numbered 1,264 781 were discharged 275 died, and at the end of the year there were 3 060 patients in the institution.

Scientific.—A brief review of the year's work at the *Institute for Medical Research* Kuala Lumpur is presented in the Report under review The investigations of *filariasis* were confined to areas previously surveyed (see this *Bulletin* 1939 Supp. p 181*) the *tuberculosis survey* has been briefly referred to in a preceding section of this summary *malaria* investigations included experiments on the chemo-prophylaxis of the disease, new anti-malarial remedies, mosquito investigations and anti-larvae oils the study of local *typhus fever* was continued, as was the experimental work on methods of rat destruction. The work of the Lymph Station continued to be satisfactory In the Chemical Division certain proprietary preparations were assayed for Vitamin B₁ content, and the relative nutritional value of parboiled undermilled rice is being investigated.

Financial.—Total expenditure on Medical Department Services during 1938 amounted to \$4,855 675 and in addition the Public Works Department spent \$695 123 on new buildings and maintenance, while

further expenditure on anti malarial works from Sanitary Board and other Government funds not administered by the Medical Department amounted to \$615,219

MALAY STATES NOT INCLUDED IN THE FEDERATION Johore (1938)

The State of Johore lies at the southern extremity of the Malay Peninsula to the north is Pahang to the north west Negri Sembilan and Malacca, on the west the Straits of Malacca, on the south the Strait north of Singapore and on the east the China Sea. The area of the State is about 7 320 sq miles almost exactly that of Wales.

Introductory—A year ago in these pages mention was made of the considerable improvements introduced in the Annual Medical Reports of the State of Johore. In the Report under review further improvements have been introduced the practice of presenting illustrations of the various amenities provided in the interests of public health is continued and for the first time the Report is presented in two parts and described as follows —

Part I is intended for those members of the public who wish to know in a general way something of the work and progress of the Johore Medical Department. Figures and other statistical data are reduced to a minimum.

Part II contains statistics and similar details which are essential for reference by the administrative and other members of the staff of the Medical Department, and in order to enable comparisons to be made from year to year. It is only by a study of these figures that the effectiveness of policies pursued can be checked. Such figures and details are perhaps of little general interest and have therefore been bound separately so as not to confuse or weary the average reader.

Vital Statistics—A new Enactment to provide for the *Registration of Births and Deaths* was passed by the State Council and approved by H.H. the Sultan. When this Enactment comes into force it will provide among other matters for the creation of local district registries. The relevant vital facts for the year under review read as follows —

Race	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Europeans	1 080	17	15.7	2	—	0	0
Eurasians	440	4	9.1	2	4.5	1	?
Malayans	306,240	13 103	42.5	6,238	20.4	2,798	213.4
Chinese	311 620	14,839	47.9	5,946	19.1	1 838	129.7
Indians	84,090	2,023	24.1	1 724	20.5	394	194.7
Others	4 400	115	26.1	41	9.3	14	121.7
Totals	709,870	30,201	42.5	14 001	19.7	5 143	170.5

European Officials resident numbered 153 one death and one invaliding were recorded. Of *Asiatic Officials* there were 7 576 resident within this group 45 invalidings and 16 deaths were recorded.

The Medical Staff comprised a Principal Medical Officer (Dr G H GARLICK) a Deputy Principal Medical Officer 35 Medical Officers (including specialist officers) 4 Lady Medical Officers and 6 Dental Surgeons.

Estate Populations—Details supplied in former Reports appear to have been omitted from the Report under review (see this *Bulletin* 1939 Supp p 182*)

Maternity and Child Welfare Work—Work on a new First Class Maternity Hospital is about to commence. Maternity cases admitted to and delivered in Government Hospitals numbered 3 828 and 48 maternal deaths were recorded. Hospital Staffs attended 153 confinements at the homes of patients, 804 maternity cases were conducted by the staffs of Women's and Children's Clinics and 572 by certified midwives (non-Government). In the State as a whole 217 deaths were ascribed to *diseases of pregnancy and childbirth* etc. It is said that *anaemias in pregnancy* account for the majority of the maternal and foetal deaths among the Asiatic population and that this condition is a major issue facing the Maternity service in Johore.

The four Women's and Children's Clinics each under the charge of a Lady Medical Officer continued to function with success throughout the year. A service of buses provides for the transport of patients to the Clinics while Clinic Staffs also make domiciliary visits to women and children in their respective areas. During the year under review these buses covered over 68 000 miles during the course of conveying 73 616 patients to the Clinics. New cases seen at the Clinics totalled 36 131 and of these 18 461 were infants and young children. At the Ante-Natal Clinics 3 493 new cases were dealt with. 30,692 domiciliary visits were made by Lady Medical Officers, Maternity Nurses and Midwives, and a further 38 880 women and 40,654 children were visited by arrangement.

Midwives are trained in the bigger hospitals of the State. Out of 41 pupil midwives in training 12 passed the required examinations and were granted certificates authorizing them to practise and an additional 23 new midwives were granted similar authority. There are now 159 certified midwives in the State including 59 in Government service and 6 subsidized midwives working in *kampongs*.

School Hygiene—There are approximately 31 000 boys on the register of schools in the State and during the year under review 10 458 boys distributed over 98 schools were medically examined. The main defects noted among the Malay boys were *dental caries* and *scabies*. In one area 33 per cent of the boys showed gross dental defects, and in one school 25 per cent of the boys were suffering from scabies. It is probable *helminthic infections* are numerous but it was not found possible to confirm this by microscopical examination of specimens. The *spleen rate* varied between place and place in the coastal area the rate did not exceed 5 per cent in any school but for the inland area in one school the rate of 67 per cent. was recorded.

Girls' Schools are examined by Lady Medical Officers. Out of 7 000 girls on the registers 4 035 were examined, the principal defects noted being infestation with *P. cepitis* helminthic infections and *anaemias*.

Dental Clinics are established at five centres in the State, a new clinic being opened at Segamat in May 1938. The aim of these clinics is to give complete dental treatment and to train children in the principles of oral hygiene. During the year 7 162 patients were examined and 8,082 were found to require treatment.

Public Health Sanitation etc—There are three Health Officers located in convenient centres for dealing with work in prescribed areas. Health Officers are members of the *Town Boards* (see this *Bulletin* 1939 Supp p 182*) in their respective districts and their work includes all the usual duties associated with public health work. The control of malaria in the State is administered centrally by the *Anti Malaria Board*. During 1938 a sum of \$73 000 was voted to the Board (exclusive of salaries and permanent drainage work) for the control of malaria. The work is described at some length and details are summarized in Part II of the Report.

As regards *sewage disposal* in the Town Board areas except for the better class houses night-soil is collected in buckets the question of water borne sewage has been raised at some Town Board meetings. *Water supplies* in the bigger areas are on the whole satisfactory in quantity and quality. The Mount Ophir Water Supply Scheme which was practically completed by the end of the year will provide water to ten towns and villages controlled by the Muar Town Board and to the neighbouring rural population. The Batu Pahat district supply scheme nears completion and investigations continue with regard to the provision of water to the smaller Town Board areas. Under the heading *Rural Hygiene* the difficulties of making contacts with the rural population are discussed at length all services are gradually being extended but progress is necessarily gradual by virtue of the conservative nature of the communities concerned. A survey of *housing conditions* was carried out in the shop house area of Johore Bahru town with a view to effecting improvements in the insanitary conditions and overcrowding existing in this area. 85 per cent. of the population examined were found to be living under insanitary conditions of varying degree. *Markets* where fresh provisions are sold are under the control of the Town Boards in the larger towns and in villages are supervised by Town Board Officers.

Inspections of *Estates and Mines* are probably the biggest items in the daily work of health officers. During the year 775 estates were inspected and 5 649 coolies were examined (see this *Bulletin* 1939 Supp p 183*).

Port Health Work—This is unmentioned in the Report under review.

Hospitals Dispensaries etc—Hospital accommodation has been increased by the construction of two 2nd class wards at the General Hospital, Johore Bahru and one at Segamat. A new 26-bed General Ward was opened at Kota Tinggi and new Isolation Hospitals are under construction at Tampoi and Mersing. During the year a new 3rd class block for the General Hospital Johore Bahru was commenced. This will be a five-storey building of 800 beds embodying the latest features in tropical hospital construction. Government Hospitals their bed accommodation and numbers of patients treated are discussed at some length. To all institutions (total bed accommodation 3 162) 50,294 patients were admitted 52,806 were treated, and 2,940 deaths were recorded.

Out-patients are treated at (a) 14 *Out-patient Clinics* of established hospitals (b) 8 *Outdoor Dispensaries* by (c) 5 *Motor Travelling Dispensaries* (d) one *Motor Launch Dispensary* and (e) *Travelling Dressers*. The record of work dealt with may be summarized as follows.—Hospital out-patients 59 687 *Out-door Dispensaries* 44 629 *Motor Travelling Dispensaries* 108,229 *Motor Launch Dispensary*

17,425. Other centres 22,900. These data represent new cases for which 382,183 treatments were given.

The *New School of Nursing and Nurses Hostel* was completed and occupied during the year there is accommodation for 80 nurses in the Hostel and for 20 pupils in the School. Of the 21 pupils, 8 completed their training and were absorbed into the Nursing Service of the Medical Department (For *Midwives* see *Maternity* and *Child Welfare* above.)

Dressers are trained in the General Hospital, Johore Bahru, and in the Muar Hospital. Health Inspectors and Anti-malaria Board Staff are trained by Health Officers.

There are 48 *Estate Hospitals* in the State no details of work are supplied.

As judged by the recorded vital facts the general health of the population during 1938 was satisfactory the death rate was the lowest on record. The more outstanding items of morbidity experience are the subject of brief reference in the notes which follow.

No case of *plague*, *cholera* or *smallpox* was recorded. During the year 28,051 vaccinations were performed 18,727 of these by the Travelling Government Vaccinators. The principal infectious diseases reported and treated as hospital in-patients are given as follows —

Disease	Cases Reported	In patients		Hospital Deaths	Deaths in the State
		Admitted	Treated		
Enteric Fever	277	305	323	73	73
Chicken-pox	367	166	157	0	0
Measles	226	74	80	2	1
Diphtheria	80	80	91	32	3*
Erysipelas	20	28	28	3	3
Cerebrospinal Fever	10	12	12	10	8
Tropical Typhus	2	4	4	0	0

It will be noted that for some diseases the numbers of cases admitted to hospital during the year exceed the numbers notified (e.g. *enteric diphtheria erysipelas cerebrospinal fever tropical typhus*).

The principal diseases treated in Government hospitals during the year included the following —

Altogether 12,431 in-patient and 19,283 out-patient cases of *malaria* were treated. Malaria was registered as the cause of the deaths of 542 persons in the State and in addition 4,898 deaths were ascribed to *unspecified fever*. The distribution of types of infection among in- and out-patient cases of malaria reads as follows: —

Type	In-patients			Out-patients
	Admitted	Treated	Died	
<i>Banget tertias</i>	3,378	3,458	44	499
Quartan	64	65	1	10
Subtertian	4,633	4,767	163	49*
Mixed infections	1,918	1,953	106	178
Cachexia	204	313	20	268
Cerebral	37	38	11	—
Blackwater Fever	15	15	4	—
Unclassified	1,799	1,837	58	17,840

At the two Laboratories in the State 30 087 blood films were examined and positive findings were recorded in 5 046 cases, *P. vivax* infections accounting for 2 032 and *P. falciparum* for 1 460 of the positives.

Dysentery was responsible for 575 in patient cases (542 admitted during the year) and 87 hospital deaths and in addition 1 091 persons were treated as out patients. Deaths due to this cause in the State as a whole numbered 114. As regards types of infection among hospital in patient cases 271 were *amoebic* 91 *bacillary* 2 were mixed infections and in 211 cases the type was not defined.

In patient cases of *tuberculosis* (all forms) totalled 1 023 and 352 hospital deaths were recorded. 925 of the cases and 327 of the deaths were due to the *pulmonary* form of the disease. Among 536 out-patients treated for *tuberculosis* 440 were suffering from the *pulmonary* form of the disease. At the laboratories where 3,236 specimens of sputum were examined, 431 were positive with *Mycobacterium tuberculosis*. Among other *respiratory* affections treated in patient cases of *bronchitis* numbered 1 168 (29 deaths) *broncho-pneumonia* 371 (163 deaths) and *pneumonia* 667 with 242 deaths. In addition there were 30 470 out-patient cases of *bronchitis* 57 of *broncho-pneumonia*, and 235 of *pneumonia*.

To the *Leper Asylum* Johore Bahru 146 patients were admitted 413 were under treatment 3 were discharged 78 absconded and 16 died, leaving 316 inmates in residence at the end of the year. Of the 413 patients 294 were Chinese. Among 210 smears examined at the State Laboratories 48 were positive with *Mycobacterium leprae*.

Beriberi was the registered cause of the deaths of 299 persons in the State during the year under review. For this condition 676 patients were treated in Government Hospitals with 68 deaths and there were also 4 855 out-patient cases.

Other diseases and causes responsible for a considerable amount of disability include the following —

Item	Hospital In-patients	Hospital Deaths	Out-patients
Influenza	1 715	10	19,907
Ankylostomiasis	—	—	2,658
Other helminths	1 138	11	8 697
Yaws	7	—	2,650
Rheumatism	177	1	4 476
Anaemias	570	90	9 652
Ulcers	1 069	2	14,598
<i>Veneral Diseases—</i>			
Syphilis	690	32	2,589
Gonorrhoea, etc.	868	—	2,386
Tropical Babo	104	—	178
External Causes	3,838	97	11 659

Scientific.—There are two Laboratories in the State fully equipped for carrying out every kind of routine investigation for the Medical and Health Services. One Laboratory is the new Central Laboratory at the General Hospital, Johore Bahru which was completed and brought into operation during the year and the other is at the Muar

Hospital. At these two Laboratories 87,374 pathological and bacteriological examinations were carried out and in addition 684 samples of milk, water sewage effluents, etc. were subjected to chemical examinations. Other hospitals in the State are equipped with small laboratories for simple examinations and in these 128,253 specimens were dealt with. Details of the specimens received and findings recorded in all laboratories are set out in an excellent series of tabulated statements in Part II of the Report under review.

Financial—Total expenditure on Medical Department Services during 1938 amounted to \$1 718,808 a sum which represents 8.8 per cent of the total revenue of the State for the same year and approximately \$2.4 per head of population.

Kedah (1938)

Kedah a Malay State under British protection lies on the west coast of the Malay Peninsula. It is bordered on the interior by Siam and Perak, and includes the island of Langkawi and a number of smaller islands to the south. The mainland is about 165 miles long and about 65 miles wide at its widest part. Its area including the Langkawi group of islands, is about 3,643 sq. miles.

Introductory—The two summaries which follow and relate to the States of Kedah and Perlis have been compiled from the accounts contained in the Pan Malayan Report for 1938. The Annual Report of the Medical Department Kedah and Perlis 1938 a separate publication, contains detailed accounts of all public health activities in these two States. Special features include a Report of the work of the Women's Department by the Lady Medical Officer Dr. Mabel BROWN, a Report of the Health Branch by Dr. R. D. GROSS descriptions of Kampong Improvement Work (this section being copiously illustrated) results of an Experiment on the Control of Rice-field Malaria, Laboratory Report, etc.

Vital Statistics—The estimated population was 481,242. The racial ratios are said to have remained constant with Malays comprising 67 per cent Chinese 18 per cent and Indians 12 per cent of the total. Registered births numbered 21,238 and deaths 10,575 the resulting annual birth and death rates being 44.1 and 22.0 per 1,000 respectively. The infant mortality rate was 131 per 1,000 live births. (For fuller details see this Bulletin 1939 Supp. pp. 186*-187*.)

The Medical Staff during 1938 comprised a State Surgeon (Dr. J. C. CARSON) one Senior Health Officer one Lady Medical Officer and 14 Medical and Health Officers.

Maternity and Child Welfare Work—The Lady Medical Officer reports that on the average some 300 out-patients (women and children) were seen at the hospital and at the Town Dispensary an average of 850 per month. Among these out-patients were 321 expectant mothers, and in addition considerable numbers were seen in their own homes (see this Bulletin 1938 Supp. p. 189* and 1939 Supp. p. 187). Special efforts are being made to establish trained Malay midwives in the kampongs. Seven have been trained and posted and six more will shortly be available for this service.

School Hygiene—Services continued to function as usual (see this Bulletin 1939 Supp. p. 188*) and during the year under review 7,000

pupils in Malay schools were examined. The principal defects noted included *dental caries* 35 per cent *skin diseases* 15 per cent *enlarged spleens* 5.2 per cent *anaemia* 2.7 per cent, and *jaws* 1.3 per cent.

Public Health Sanitation etc—In the nine Sanitary Board areas general conditions with regard to methods of *sewage and refuse disposal* and *water supplies* remain as described in previous issues of this Supplement. *Rural Health Work* received special attention and a beginning was made to improve the general sanitation in rural areas. The first step was to ensure the provision of proper latrine accommodation and after overcoming the suspicions and objections of rural populations work was started in South Kedah later extended to Central Kedah the Baling areas and later in the year to Langkawi. Lectures were also given to villagers on such matters as night soil and refuse disposal water supplies dietaries etc. All these matters are described at some length in the Report under review. The introduction in kampong areas of small motor rice mills producing a highly polished rice may give rise to increase in the infant death rate and incidence of beriberi.

On *rubber estates* the Kedah Health Board scheme continued to function smoothly. New lines for the housing of labourers were erected on 53 estates and 6 others submitted plans for building which were approved. Anti malarial work continued to be carried out on estates where malaria exists. On one group of estates (there are 83 European owned and 6 Asiatic estates) a scheme was submitted for infant welfare and ante-natal work as an experiment.

Hospitals Dispensaries etc—There was no change in 1938 in the number or distribution of hospitals in the State (see this *Bulletin* 1939 Supp p 189*) though the normal bed accommodation of these institutions has been increased to 967. The Health Board groups also maintain 12 hospitals with a total accommodation of 1 101 beds. Two new *dispensaries* were built and there are now 7 outdoor dispensaries in the State (see this *Bulletin* 1939 Supp p 190*). No detailed returns of cases treated at hospitals and dispensaries are presented in the Report under review but in the text the following references occur.

A considerable increase in *malaria* was reported throughout the State partly due to re-planting schemes carried out on rubber estates and partly to a general seasonal increase. Diagnosed malaria accounted for 364 deaths but *fevers unspecified* were responsible for 4 689 deaths.

Enteric fever was responsible for 80 notified cases and 28 deaths. 110 contacts were examined and 2 were found to be carriers and in addition an itinerant hawkler was proved to be a carrier. Also 48 coolies engaged on public water works at Sungai Patani were examined and three of these were found to be carriers.

No case of major communicable disease was reported during the year. *passengers from Thailand (Siam)* examined at the frontier station numbered 12 962. During 1938 routine vaccinations carried out by the Medical Department numbered 16,895 and in addition 1 439 vaccinations were performed at estate hospitals.

The Dental Department is rapidly developing. new cases treated numbered 1 174 and repetitions 988.

Financial—Total expenditure on Medical Department Services during 1938 amounted to \$556 102.

Perlis (1938)

Perlis is the most northerly of the Malay States, lying on the west coast of the Malay Peninsula. It is bordered on the interior by Siam to the north and Kedah to the south, and has an area of about 316 sq. miles.

Introductory—The account under review contained in the Pan-Malayan Medical Report for 1938 supplies only a very brief survey of medical and health services in Perlis. The reader is referred to the more extended references contained in the separate publication "Annual Report of the Medical Department Kedah and Perlis, 1938," and to previous issues of this *Supplement*. The only information presented is as follows:—

Total Statistics—The estimated population was 55 446 registered births 1 982, and deaths 1 111 the resulting birth and death rates being 20.0 and 35.7 per 1 000 respectively. These data are presented with distinction as to sex and race. The infant mortality rate was 111 per 1 000 live births.

The Medical Staff comprised the State-Surgeon Kedah, who visits the State at least once a month and 2 Medical Officers.

Public Health etc.—The nucleus of a public health service was created by the appointment of an Assistant Health Officer and two trained midwives. The incidence of malaria was higher than usual 538 cases were recorded. Permanent anti-malarial works are being gradually extended. Twenty persons were bitten by dogs, three fatal cases of rabies occurred at the hospital.

Hospital facilities remain as previously described. At the General Hospital, Kangar 2,075 in-patients were treated and 111 died. There was an increase in the numbers of cases admitted for malaria pneumonia, and other lung complaints, ankylostomiasis and ulcers and a decline in the admissions for dysentery. Patients admitted from mines and estates numbered 124 the total number of such patients treated was 182 and 5 died.

Financial—Expenditure on Medical and Health Services during 1938 amounted to \$44,305 a sum representing 5.7 per cent. of the total revenue of the State.

Kelantan (1938)

The State of Kelantan is on the eastern side of the Malay Peninsula. On the north is the China Sea, on the south Pahang, on the east Trengganu and the China Sea, on the west Perak and Siamese Territory. The area is estimated at 5 720 sq. miles, or rather less than that of Yorkshire.

Total Statistics—The estimated population was 369,299. Registered births numbered 13 085 and deaths 6,878, the resulting crude birth and death rates being 32.8 and 17.2 per 1 000 respectively. Infant deaths numbered 1 457 giving an infant mortality rate of 111.3 per 1 000 births.

The Medical Staff during 1938 comprised a Chief Medical Officer (Dr. H. J. Lawson) and 2 Medical Officers.

Maternity and Child Welfare Work.—Maternity facilities in the State remain unchanged (see this *Bulletin*, 1939 Supp. p. 195*). At the General Hospital, Kota Bharu, 202 deliveries were recorded.

only two Malay women were concerned. The *Infant Welfare Centre* continued to be under the charge of the Assistant Lady Medical Officer who was made a full time worker. The Centre has become very popular among mothers of all nationalities. The record of the year's work shows that 1,323 visits were made to newly born infants, 2,838 visits to women (1,440 were Malays) and 2,160 to children. Attendances at the Centre totalled 13,187.

School Hygiene—Twenty-eight schools were inspected and 2,224 pupils were medically examined. General health and cleanliness of the pupils are reported to have been satisfactory. No details of the results of medical examinations are supplied.

Public Health Sanitation etc—During 1938 the health of the State is reported to have shown a general improvement; no unusual features call for special comment. No change in the organization of health services is recorded except that in Kota Bharu a Town Board was created early in the year. *Anti malarial work* continued to be carried out along lines described in previous issues of this *Supplement*. As no mention is made of methods of *sewage and refuse disposal* it may be presumed these services continue to function as formerly (see this *Bulletin* 1939 Supp. p. 196*). Kota Bharu continues to be the only town in the State having a piped *water supply*; considerable extension of water mains and increase in the numbers of premises provided with piped supplies are reported. The provision of piped supplies to Kuala Krai is under consideration.

On *estates and mines* subject to medical inspection anti-malarial measures continued to be carried out while housing, medical aid and other matters of sanitary importance received particular attention.

Hospitals Dispensaries etc—A new infectious diseases ward was completed and opened at Kuala Krai during the year. Hospital admissions totalled 6,074 and 294 hospital deaths were recorded; these figures include 100 admissions to and 3 deaths in the *Mental Hospital*. *Out-patients* treated were as follows: (a) at *hospitals* 36,605; (b) at *dispensaries* 45,787; while (c) *travelling dispensaries* recorded 104,544 attendances.

To the *European Hospital* 33 patients were admitted during the year.

Disease incidence in the State is measured by hospital, dispensary, and travelling dispensary records; the notes which follow briefly relate to the principal items of morbidity experience during 1938.

Malaria is still the principal disease encountered and the main cause of death. The disease has declined in controlled areas and on estates subject to medical inspection but in remote areas and hilly districts where anti-malarial measures cannot extensively be applied it remains highly prevalent. Admissions to Government hospitals for this cause numbered 1,691 with 62 deaths; the figures include 14 cases of *blackwater fever* with 3 deaths.

No case of *plague cholera* or *smallpox* was recorded. During the year 265 anti-cholera inoculations were given to pilgrims to Mecca while routine anti-smallpox vaccinations continued to be carried out as in previous years at hospitals, dispensaries, the infant welfare clinic, and by travelling vaccinators who tour the State district by district.

Pulmonary tuberculosis is prevalent and actual incidence is believed to be much higher than recorded figures suggest for cases are rarely seen except in the advanced stages (see this *Bulletin* 1939 Supp. p. 198*). In Government hospitals 178 cases were treated with 65

deaths. In all hospitals accommodation is being provided for tubercular patients and in Kota Bharu there is a special ward with 20 beds for males. Fewer cases of *pneumonia* were recorded hospital admissions numbered 67 and deaths 13.

Seven cases of *enteric fever* were admitted to hospitals and four deaths were due to this cause. The usual preventive measures and T.A.B. inoculations were carried out. Eighty-one cases of *dysentery* of which 58 were *amoebic* and 25 were *bacillary* infections were treated in hospitals there were also 45 in-patient cases of *diarrhoea* and *enteritis*.

Admissions to hospitals on account of *beriberi* numbered 123 the majority of the cases were mining labourers of whom 78 were Chinese.

A *leprosy* survey was commenced towards the end of the year (see this *Bulletin* 1939 Supp., p. 198*) and over 100 new cases have been detected so far. In view of the fact that a large number of lepers are not adequately isolated, Government is taking steps to provide a Leper Settlement.

Venereal Diseases—Hospital admissions for *sypilis* were 81 for *gonorrhoea* 219 and for *soft chancre* 24 in addition 3,364 cases were treated at various dispensaries throughout the State. The true incidence of these diseases cannot be ascertained—women rarely present themselves for treatment and other patients do not persist in treatment to cure. Attendances for treatment of *yaws* totalled 21,957.

Financial—Total expenditure on Medical Department Services amounted to £209,464 a sum which represents approximately 7 per cent of the total expenditure of the State.

Trengganu (1938)

The State of Trengganu lies on the eastern seaboard of the Malay Peninsula 4° and 5° 5' N lat and 102° 20' and 103° 30' E long. It has an area of 5,030 sq miles.

Vital Statistics—The estimated mid-year population was 201,370 and birth and death rates have been calculated on this basis. *Registered births* numbered 8,259 and *deaths* 4,785 the resulting crude rates being 41.0 and 23.8 per 1,000 respectively. Births and deaths are classified with racial distinction, but as this classification is not applied to the estimated population specific birth and death rates cannot be calculated. *Infant deaths* numbered 1,854 giving an infant mortality rate of 200.3 per 1,000.

On Estates where the average monthly population totalled 7,064 deaths recorded during the year numbered 73.

European Officials resident numbered 23 with an average number resident of 18 no invalidings or deaths were recorded.

The Medical Staff during 1938 comprised a Medical Officer in charge (Dr A. L. SKIELD) and two Assistant Medical Officers.

Maternity and Child Welfare Work—At the Kuala Trengganu Hospital 103 maternity cases were dealt with and 3 maternal deaths recorded, the Town Clinic dealt with 123 cases and midwives at three centres with 182 cases. Ante-natal cases numbered 187 and attendances for examination 347.

In addition to the cases recorded above in Kuala Trengganu 305 maternity cases were conducted at the homes of patients. In the State as a whole 65 women are stated to have died as the result of childbirth giving a maternal mortality rate of 7.8 per 1 000 births.

The numbers of qualified *midwives* in the State remained unchanged (see this *Bulletin* 1939 Supp p 189*) It is hoped with the help of district midwives to build up gradually a *child welfare service* they are expected to pay ten daily visits to mothers and infants after delivery and also to assist in the treatment of women and children in the dispensaries. At the Kuala Trengganu Town Clinic 225 infants under one year and 1,271 children between the ages of 1-12 years received treatment during the year while in addition 22 infants and 73 other children were treated as hospital in patients. The variations in district mortality rates are again commented upon in the Report under review (see this *Bulletin* 1939 Supp p 200*)

School Hygiene—Twenty five Government schools and 6 private schools were inspected and 2 909 children medically examined during the year (i.e. 80.1 per cent of the number of pupils on the school registers) Results are tabulated by districts but for purposes of this summary it must suffice to state that of these 2,909 children 48.5 per cent. showed *dental caries* 2.6 per cent suffered from *yaws* 2.7 per cent. had *enlarged spleens* 5.1 per cent suffered from *ulcers* and 9.7 per cent from *skin diseases* To deal with the high incidence of dental caries an Assistant Dental Officer is to be appointed.

Public Health Sanitation etc.—Town Boards and their Staffs remain as previously described (see this *Bulletin* 1938 Supp p 202* and 1939 Supp p 200*) *Anti-malarial work* methods of *sewage and refuse disposal* and sources of *water supplies* remain for all practical purposes as described in previous issues of this *Supplement* in Kuala Dungun and Chukai conservancy systems increased their services and in the Trengganu Town area boring was carried out in the hope of discovering additional water supplies but these efforts proved unsuccessful. *Housing and Town Planning* matters continue to receive the close attention of the Town Boards and Health Inspectors maintained their regular inspections of house property and where necessary recommended the demolition of insanitary dwellings.

Brief mention has been made of the numbers of labourers employed on *Mines and Estates* (see *Vital Statistics* above) It remains to say that a steady improvement in the health and living conditions on most of these properties is again reported All mines and estates were visited and inspected by the Medical Officer Assistant Medical Officers and Health Inspectors during the year and suggestions and recommendations submitted for improvements were invariably carried out without delay

Hospitals Dispensaries etc.—New buildings completed during 1938 included the following *Kuala Trengganu Hospital*—two wards each of 30 beds for 3rd-class patients a 2nd class female ward and a six roomed ward for mental patients. *Beaut Dispensary*—a six-roomed emergency ward *Kemaman Hospital*—a new administration block and operating theatre. In all three hospitals there are now available 238 beds for in patients. To the three hospitals (total beds 238) in the State 3 783 patients were admitted 3,935 were treated and 120 died there were also 16 790 out patients

For the treatment of out-patients in addition to facilities provided at the three hospitals permanent *Dispensaries* are established at

seven centres while Travelling Dressers visit outlying areas. Vaccinators distribute medicines and rural police and customs stations situated where there are no dispensaries are supplied with stocks of simple drugs for distribution (see this *Bulletin* 1939 Supp. p 201*). Patients treated during the year were By Dispensaries and Travelling Dressers 110,273 by Vaccinators 21,114 by Police and Customs Stations 585

The most reliable information as regards the incidence of disease in Trengganu is supplied by the records of patients treated at State hospitals and dispensaries the notes which follow briefly summarize the principal items of morbidity experience recorded during 1938.

Malaria was responsible for 34.5 per cent of the total admissions to hospitals there were 1,301 cases of malaria with 24 deaths and 4 cases of blackwater fever with 2 deaths. Of the total cases admitted 234 were benign tertian infections 317 were subtertian 28 quartan 49 mixed infections, 17 were malarial cachexia and in 628 cases the type of infection was not determined. At the Laboratory where 4,401 blood films were examined for the presence of malaria parasites 362 were positive with *P. vivax* 528 with *P. falciparum* 47 with *P. malariae* and 87 were mixed infections.

In the State as a whole 84 deaths were ascribed to malaria, 2 to blackwater fever and 2,670 to unspecified fevers. Among mines and estates populations 10 deaths were notified as due to malaria.

One non-fatal case of tropical typhus was admitted to hospital diagnosis was confirmed serologically and proved to be of the "Shop" type (Proteus Y W strain).

Fourteen cases of enteric fever were reported and admitted to hospital two patients died. At the Laboratory 49 Widal tests were carried out and in 8 cases the sera agglutinated positively with *Bact. typhorum*. Fifty-four patients were admitted to hospital suffering from dysentery of these 39 were amoebic and 7 were bacillary cases two patients died. There were also 136 out-patient cases of which 5 were reported as amoebic. From mines and estates 48 cases of dysentery were reported.

Among 4,322 faecal specimens examined at the Laboratory 45 contained the protozoan *E. histolytica*.

Tuberculosis accounted for the deaths of 42 persons during the year under review. Hospitals treated 89 in-patient cases of tuberculosis (all forms) and of these 60 were cases of the pulmonary form of the disease causing the deaths of 19 patients. At the Laboratory among 471 specimens of sputum examined 81 were positive with *Mycob. tuberculosis*. For other respiratory affections 168 persons received hospital in-patient treatment and 14 died. Among these patients were 89 non-fatal cases of bronchitis 38 non-fatal cases of asthma and 28 cases of pneumonia causing 13 deaths.

Beriberi caused the deaths of 31 people in the State as a whole during the year 790 patients were dealt with and of these 158 were treated as in-patients with 8 deaths. Excellent results are reported in cases with cardiac symptoms by using injections of Vitamin B but the same preparation used in neuritic cases gave disappointing results (see this *Bulletin* 1939 Supp. p 202*).

Helminthic infections are again reported to be very prevalent and it is said that approximately 70 per cent. of all stool specimens examined were positive with some helminthic infection, usually multiple. In addition to the detailed results presented of all stool examinations the Laboratory Report observes. Infections with

ankylostoma *ascaris* and *trichuris* are very common. Among hospital in-patients were 58 cases of *ankylostomiasis* and 50 cases of *ascariasis*.

The Report observes that 12 *lepers* are maintained by the State in the Sungai Buloh Settlement (Selangor F.M.S.) but in the classified Hospital Returns 16 cases of leprosy are recorded. The Laboratory shows that among 24 nose and skin smears 2 were positive with *Mycobacterium leprae*.

Veneral Diseases—During the latter part of 1938 a particularly virulent type of soft sore was seen that continued to spread rapidly and destroy tissue, no matter what treatment was given. Most of the cases came from Dungun and believed to have been imported by sailors on overseas ships. In patient cases of venereal disease treated during the year were *gonorrhoea* 168 *syphilis* 52 and *granuloma venereum* 45.

In addition there were 516 out patients treated for *gonorrhoea* 23 for *syphilis* and 88 for *soft sore* and *lympho-granuloma venereum*.

In-patients treated for *yaws* numbered 114 and out-patients 11 123. During the last four months of the year an intensive campaign was carried out with Stovarsol and this accounts for the large number of out patient cases dealt with.

Among other diseases dealt with during the year the Report mentions 3 636 cases of *influenza* (the term includes the common cold) and 248 in patient cases of *ulcers*. Among the deaths recorded in the State were those of six persons killed by tigers and one by a snake.

Scientific—The Laboratory Report presents a classified statement of the numbers and nature of specimens received for examination and results recorded. The principal findings have been referred to under various headings in the preceding notes (see this *Bulletin* 1939 Supp. p. 203*).

Financial—Total expenditure on Medical Department services during 1938 amounted to \$120 685 a sum which represents 5.1 per cent. of the total State expenditure during the same year.

BRUNEI (1938)

The native state of Brunei lies on the north west coast of the island of Borneo between North Borneo and Sarawak. It is 770 miles from Singapore and has an area of about 2,230 sq. miles, or rather smaller than the county of Devon. In Brunei Bay lies the island of Labuan.

Vital Statistics—At the end of the year the population was estimated to number 37 868 though it is added this figure is probably too high. The indigenous population is made up of a variety of races. Brunei Malays are said to be numerically the largest race (no figures supplied). Registration is said to be "probably fairly complete." Registered births numbered 1 431 and deaths 833 the resulting crude birth and death rates being 37.8 and 22.0 per 1 000 respectively. Of the births recorded 702 were contributed by Brunei Malays and 518 by native Bornean races other than Malays and of the total deaths 410 occurred among Malays and 344 among other Bornean races. There were 300 infant deaths giving an infant mortality rate of 210 per 1 000 births.

Medical Staff—Dr. O. E. FISHER a member of the Malayan Medical Service is in charge of the Medical and Health Administration of the State.

Maternity and Child Welfare Work—In December H.H. The Sultan of Brunei opened the new Maternity and Child Welfare Clinic in Brunei Town the Report under review reproduces photographs of the exterior and interior of the Clinic. A whole-time staff is employed and includes one health nurse one probationer and two midwives. A Baby Show held in connexion with the opening ceremony proved a great success when about 120 babies of the Clinic competed. The Maternity service is popular and practically all births in the Brunei area are attended by Government midwives. 540 births were dealt with and no maternal death was recorded. In the rest of the State where for the most part no midwifery services are available 15 maternal deaths occurred. At the *Welfare Clinic* 1,957 infants attended. The deficient diet of the average native is largely responsible for the high infant mortality (see this *Bulletin* 1939 Supp. p. 204*). No welfare work is yet possible outside the Brunei area but arrangements have been made to send a girl to Singapore for training with a view to the establishment of a welfare centre in Kuala Belait. Details of the work carried out at the Clinic are set out in an Appendix to the Report under review.

School Hygiene—The reader is referred to previous issues of this *Supplement*. The only information contained in the Report for 1938 is in a tabular statement showing the results of Spleen and Stool Examinations of School-children. This shows that during the year 1,337 children were examined spleen rates ranged from nil to 50 per cent and *Ascari* infection rates from 37.5 to 97.1 per cent. Among 532 children examined in five areas *Ancylostoma* infection rates ranged from 1.1 to 33.3 per cent.

Public Health Sanitation, etc.—Dr Fisher reports that the general health of the State during the year under review was good. Regular anti-malarial work is only possible at Brunei and Kuala Belait and both of these places are kept free from the disease. The area of control was extended in Brunei in rural areas the distribution of free quinine is the only practical measure possible (see this *Bulletin* 1939 Supp. p. 206*). Methods of storage and refuse disposal remain as described in previous issues of this *Supplement* an increasing number of houses in Brunei and Kuala Belait have their own water-borne sewage systems. *Water supplies* remain as described in this *Bulletin* 1939 Supp. p. 205. It is stated that the catchment area of the Tassek Reservoir (Brunei Town supply) is not satisfactory as contamination probably occurs an up-to-date purification plant is to be installed. In the Sanitary Board areas housing is said to be satisfactory save in the case of native houses which lack sanitary conveniences. Outside the Sanitary Board area of Brunei Town is the river town consisting of houses built on piles set in a broad sweep of the Brunei River. Excreta and rubbish are dumped into the river which is tidal. An excellent photograph of this housing feature appears in the Report.

There are four European Estates in the country and innumerable small holdings. Records are said to be available only for European estates where regular inspections are carried out no details of these records are supplied. Estate labour consists almost entirely of Brunei natives. The largest employer of labour is the British Malayan Petroleum Company at Kuala Belait. This Company pays high wages, provides excellent housing and other amenities for its labour maintains a well-equipped hospital, and has recently established an infant welfare centre for the benefit of its employees.

Hospitals Dispensaries etc—Hospitals were described in this Bulletin 1939 Supp p 205 * it remains to add that during the year additional constructions to the Brunei Town Hospital were completed increasing the bed accommodation from 30 to 48 beds

There are two small *dispensaries* each with a dresser in charge in outlying parts of the State the rest of the population has to rely on *travelling dispensaries* operating from Brunei Tutong and Temburong

The returns of work carried out at Government Hospitals may be summarized as follows —

Hospital	Admitted	Treated	Deaths	Out patients	
				Cases	Attendances
Brunei	569	594	18	13 785	25 056
Tutong	32	34	—	3,823	4 905
Temburong	13	15	—	1 717	2,350
Totals	614	643	—	19 435	32,311

Of *malaria* 763 cases were treated by the Medical Department and 4 deaths were ascribed to this cause during 1938 The increase in the number of cases dealt with is attributed to the extension of travelling dispensary services 82 cases were admitted to Government hospitals and one died. One mild case of *blackwater fever* was recorded. Types of infection given for in patients at the Brunei Hospital show that among 78 cases 43 were *subtertian*, 16 *benign tertian*, 7 *quartan* and one of *blackwater fever* are mentioned. It is stated that very little malaria is reported on the various rubber estates but the disease is common in rice-growing areas

In a series of Tables data relating to anopheline larva and breeding places within and outside the Sanitary Board areas of Brunei and Kuala Belait are presented. The more common anophelines found in the ricefields are *A. kochi*, *A. barbatipes* and *A. leucosphyrus*

At the Laboratory 1 471 blood films were examined for the presence of malaria parasites 107 were positive with *P. falciparum*, 95 with *P. vivax* and 28 with *P. malariae*

Tuberculosis is prevalent especially amongst the Chinese. Hospital returns show that 22 in patients were treated for all forms of the disease and of these 19 were suffering from *pulmonary tuberculosis* one patient died. For other *respiratory diseases* 28 patients were treated in hospitals (among them 9 cases of *bronchitis* and 4 of *pneumonia*) and 2 000 out patient cases were also dealt with.

Deficiency Diseases—The poor diet of the people is said to be the most important single cause of ill health in the State (see above *Infant Mortality*) and nutritional disorders figure somewhat prominently among the returns for both in and out patients these summarized read —

Disease	In patients	Out-patients
Avitaminosis	3	13
Berberi	27	146
Malnutrition	11	13
Anaemia	2	640

On the *Estates* it is stated that no new cases of *beriberi* were reported during the year. This improvement is attributed to the fact that fresh foodstuffs and hampong rice are regularly supplied to labourers.

Two cases of *typhoid fever* and one of *paratyphoid C* appear among the Brunei Hospital returns. Of the seven cases of *dysentery* treated in this hospital 6 were *bacillary* infections, one case of *bacillary dysentery* was also admitted to the Temburong Hospital. Among *out-patients* there were 6 cases of *bacillary* and 3 of *amoebic dysentery*.

In the State as a whole 15 deaths were ascribed to *diarrhoea and enteritis* for gastro-intestinal ailments 2,861 *out-patients* were treated.

With regard to *helminthi diseases* (see also above *School Hygiene*) it is said that *round-worm infection* is exceedingly common and that *hookworm* is much rarer. The recorded facts extracted from the classified returns of patients treated read as follows —

Disease	In-patients	Out-patients
<i>Ascariasis</i>	21	2,363
<i>Ankylostomiasis</i>	25	36
Other <i>helminthi</i> infections	—	17

Veneral Diseases — *Syphilis* is rare and the only cases seen are of patients who contracted the disease outside the State. On the other hand *gonorrhoea* of a mild type is exceedingly common even though hospital returns do not show many cases. The disease is said to cause the average native little inconvenience and complications are uncommon. Three in-patient and nine out-patient cases of *syphilis* are recorded and 11 in-patient and 34 out-patient cases of *gonococcal* infections. Five in-patient cases of *gyns* and 127 out-patient cases were treated.

Among other diseases mentioned are the following. During November a mild outbreak of *diphtheria* occurred in Kuala Belait with no mortality. Fifteen clinical cases were confined to hospital and a further 35 persons were found to be presumptive carriers of the disease. Prompt measures led to the rapid subsidence of the outbreak. Three cases of *filariasis* were seen and one case showed *F. bancrofti* in his blood. There are two known *lepers* in the State, both are advanced cases and are housed in a separate ward in the Brunei Hospital.

Scientific — The Laboratory Returns showed that 6,538 specimens of various kinds were received, examined, and reported upon during the year. These included 1,471 blood films, 2,522 faecal specimens, 1,294 samples of urine and 608 specimens of sputum.

Financial — Total expenditure on Medical and Health Services during 1938 amounted to \$47,466.

THE STATE OF BRITISH NORTH BORNEO (1938)

The State of North Borneo occupies with adjacent islands, the Northern portion of the Island of Borneo. It lies about 1 000 miles N.W.N. from Singapore and approximately 1 200 miles S. of Hong Kong has a total area of about 31 000 sq. miles and a coast line of some 900 miles. The territory is under the jurisdiction of the British North Borneo (Chartered) Company, the appointment of the Governor is subject to the approval of the Secretary of State. Headquarters of administration are at Sandakan on the East Coast.

Introductory—A number of improvements have been introduced which considerably enhance the value of the Report under review. Additional information has been made available without in any way increasing the size of the Report.

Vital Statistics—The relevant facts may be summarized as follows—

Race	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	L.M.R.
Europeans	393	6	15.2	4	10.2	1	167
Natives of N. Borneo	229 471	5 788	25.2	7 000	30.5	1 149	202
Chinese	53 636	1,604	35.5	1,274	23.7	326	175
Malays	12 933	140	12.4	230	17.7	40	286
Others	5 741	123	21.4	59	10.3	17	147
Totals	302 174	7 859	26.4	8,567	28.3	1 533	196

It will be observed that once again the numbers of deaths of Natives of North Borneo and of Malays exceeds the numbers of births recorded and that the infant mortality rates for these two racial groups are the highest in the State. In addition to tabular statements mentioned in previous issues of this *Supplement* the Report under review classifies mortality data by cause and sex for each of the racial groups.

The average labour force employed during 1938 numbered 10 430 within this group 150 deaths were recorded giving an annual mortality rate of 14.4 per 1 000.

The Medical Staff comprises a Principal Medical Officer (Dr P. A. DINGLE) and five Medical Officers designated District Surgeons.

Maternity and Child Welfare Work—This work continued along lines previously described (see this *Bulletin* 1938 Supp. p. 210*). A Maternity and Child Welfare Centre is in course of construction at Penampang. During the year a scheme for the training of midwives was drafted and approved, and a hostel for the accommodation of 8 pupil-midwives is in course of erection at Jesselton. The scheme envisages the training of native women to carry on work as midwives in the villages. Two village midwives completed their training during the year. There are now 22 women in the State registered as certified midwives and Government village midwives are stationed in five districts.

School Hygiene—There are 19 Government Vernacular Schools in the State having 1 356 pupils on the registers. The sanitary and health supervision of schools in Sandakan and Jesselton is carried out by the District Surgeons in these towns and in other places by the Dressers in charge of local Government Dispensaries. Stool examinations for

worm infestations are carried out twice during each year and necessary treatment provided. During the period, tours in various areas District Surgeons continue to examine children for signs of splenic enlargement. Dental treatment was provided for the children attending eight of the schools. Out of 779 children examined 305 were given dental treatment. It is noted that the incidence of dental caries is considerably higher in urban than in rural areas. Also during the year an effort was made to encourage children to drink milk. In Sandakan 30 children were given a free ration daily of seven ounces of milk, and in out stations steps were taken to collect herds of cattle for the purpose of obtaining milk for under nourished children. Tables are presented showing average heights and weights for each year of age 6-16 for boys attending Vernacular Schools in five centres with comparative figures for North Borneo and selected areas in British Malaya. It is interesting to note that with a single exception schoolboys in North Borneo are taller than boys of equal age in Singapore, Negri Sembilan, or Kedah. The exception is Penang where boys are slightly heavier and taller than North Borneo boys at each age 10-16 years.

Public Health Sanitation etc.—Anti-malarial measures were continued along the lines previously described (see this Bulletin 1938 Supp. p. 212* and 1939 Supp. p. 208*). A Malaria Research Unit under the charge of a Malaria Research Officer has been established at Tambunan. The cost of this work will be met from a grant provided by the Colonial Development Fund spread over three years.

A School of Sanitation has been established at Kemungan and seven houses erected for the accommodation of pupil sanitary inspectors. For information concerned with methods of sewage disposal, water supplies etc. the reader is referred to this Bulletin 1938 Supp. pp. 211*-212*.

Port Health Work.—Between January and June Hong Kong was declared an infected port on account of smallpox and 2,587 deck passengers arriving at Sandakan in ten vessels were removed to the Quarantine Station on Berhala Island. Rat control measures, etc. continued to be carried out at all ports. Ships entering B.N.B. ports numbered 65 and crews and passengers examined 4,378 and 5,843 respectively.

Hospitals Dispensaries etc.—Among new constructions or additions to existing accommodation in Government Institutions the following may be noted:—

Jessellon.—General and Maternity Wards for second and third class patients, provision of a new X-ray unit. *Tambunan.*—Buildings for Malaria Research Unit (see above). *Kemungan.*—Houses for pupil sanitary inspectors (see above). *Klagen.*—New dispensary erected and opened in March 1938. *Tongod.*—New dispensary in course of construction. *Sandakan.*—New isolation rooms at the Mental Hospital.

To all institutions 6,287 patients were admitted, 6,207 were treated and 442 died. New hospital out patient cases numbered 45,799 and repetitions 43,157.

At the 14 Government Dispensaries and 2 Travelling Dispensaries 136,987 new cases were treated and for new and old cases 224,454 attendances for treatment were recorded. In addition it must be remembered that District Surgeons periodically tour remote areas lacking established treatment centres during the course of their tours.

clinics are held and large numbers of patients are examined and treated (see this *Bulletin* 1939 Supp p 209*)

Two examinations for *Hospital Dressers* for promotion were held during the year. In June 3 Government dressers and 4 dressers in private employment sat for the examination and of these 3 qualified for promotion to Grade III. 7 Government dressers and 5 in private employ took the December examination and of these 4 qualified for promotion to Grade II and one to Grade III.

In the Report under review Dr P. A. DINGLE, Principal Medical Officer, contributes a series of observations concerned with the outstanding items of morbidity experience during the year. The notes which follow briefly refer to some of these commentaries.

Admissions to Government Institutions of patients suffering from malaria totalled 1,424 and among these 40 deaths were recorded during the year under review. Malaria was therefore responsible for about 22 per cent of all hospital admissions and 9 per cent of all hospital deaths. At various centres in the Bokaan country 760 natives were examined and 88.7 per cent of them showed enlarged spleens. Similarly at Government Dispensaries between Keningau and Bundu Tuhan 8,243 natives were examined and of these 83 per cent had enlarged spleens. Anti-malarial measures have been the subject of brief mention in the section *Public Health* above. It remains to say that the sale to the general public of mosquito-nets at cost price was continued—317 nets were sold chiefly to natives. Fifteen cases of *blackwater fever* were recorded with 2 deaths.

At the Laboratory where 3,988 blood films were examined for the presence of malaria parasites 24 per cent gave positive findings. The prevailing types of infection among positives were *P. vivax* 52.6 per cent, *P. falciparum* 30.2 per cent, *P. malariae* 12.5 per cent and mixed infections 4.7 per cent.

Among *Estate Labourers* 2,972 hospital cases of malaria were recorded with 70 deaths.

Two ships arrived in Sandakan infected with *smallpox* and a case of the disease was detected among the passengers on a third vessel. During the year 68,325 vaccinations were performed with successful results in 86 per cent of the cases.

Enteric fever is not mentioned but 484 cases of *dysentery* were admitted to Government hospitals and 59 deaths were ascribed to this cause. In addition note is made of 182 cases among *Estate Labourers* with 20 deaths. Types of infection are not stated but it is observed that there were severe outbreaks of *amoebic dysentery* in the Keningau, Tambunan and Tuaran districts causing many deaths. In the classified list of hospital deaths 36 deaths were ascribed to *amoebic dysentery*.

Cases of *pulmonary tuberculosis* admitted to Government hospitals numbered 91 with 23 deaths. (The classified returns record only 19 deaths to this cause.) At the Laboratory 23 specimens of sputum were examined and one only was positive with *Mycobacterium tuberculosis*. *Pneumonia* would appear to be a much more frequent cause of disability for 202 cases of lobar pneumonia were admitted to Government hospitals where 68 of these patients died while in addition 303 cases occurred among *Estate Labourers* and 103 deaths were recorded.

Beriberi again figures prominently in the sickness returns for during the year 356 cases were admitted to Government hospitals where 34 deaths were ascribed to this disease and among *Estate Labourers*

312 cases were recorded with 14 deaths. The considerable increase in the number of cases and deaths during 1938 is said to have been due to a large influx of refugees owing to hostilities in China.

Helminthiasis.—The campaign against *ankylostomiasis* was continued along lines previously described (see this *Bulletin* 1938 Supp. p. 212*) and all Government servants, school-children and estate labourers continued to be examined twice yearly for hookworm infection and treated if necessary. In Sandakan and Jesselton 8,263 persons were examined and 548 were found to be infected. Altogether 13,160 treatments were administered (this includes treatment without previous examination of natives in certain areas) and on Estates 6,234 labourers were treated. The *Laboratory Report* mentions that 6,504 faecal specimens were examined and that 48.7 per cent. of them contained intestinal parasites of one kind or another—38.5 per cent. contained a single variety, 7.8 per cent. contained two varieties and 0.4 per cent. contained three different varieties of parasites. Among the principal findings were *ancylostoma* ova alone 18.8 per cent., *ancylostoma* and other helminths 7.8 per cent., *ascaris* alone 31.4 per cent., *ascaris* and other helminths 8.8 per cent., *trichuris* 10.6 per cent., and *E. histolytica* 19.8 per cent.

Of the eight admissions during the year to the *Leper Settlement* 5 were Chinese, 2 were Duruns and one was a Malay. No change in methods of treatment is recorded (see this *Bulletin* 1938 Supp. p. 213*). At the Laboratory where 93 nasal and nodular smears were examined, 22 of the former and one of the latter were positive with *Mycro leprae*.

The *Veneral Diseases Clinic* in Sandakan continued to do useful work. On page 4 of the Report under review it is stated that 163 new cases were treated, but in the detailed account of the work of the Clinic it is said that 94 new cases applied for treatment. Of these 94 new cases 55 were treated for syphilis, 38 for gonorrhoea, and one for bubo. 81 of these patients were Chinese, 8 were natives of the State, 5 were Malays or Javanese and 3 were members of other races. Total treatments for venereal diseases numbered 349. At the Laboratory 363 urethral and vaginal smears were examined, and 90 of the former and 91 of the latter found to be positive with *V. gonorrhoeae*.

During the year 6,259 cases of jaundice were treated and of these 6,017 were new cases.

Scientific.—Mention has already been made under various headings in the preceding notes of the principal specimens examined and findings recorded, and also of the establishment of the new Malaria Research Unit at Temburan.

Financial.—Total expenditure on Medical Department Services during 1938 amounted to £233,459 compared with \$197,917 in 1937 (Sterling value of the Straits dollar is 2s. 4d.). It is regretted that in the preceding issue of this *Supplement* Medical Department expenditure for 1937 was erroneously quoted.

HONG KONG (1938)

Hong Kong is one of a number of islands off the south-east coast of China at the mouth of the Canton River about 91 miles south of Canton and 40 east of Macao. Hong Kong is 11 miles long and from 2 to 5 miles wide and has an area of about 32 sq miles. It is separated from the mainland of China by the Lyeemoon Pass. The peninsula of Kowloon on the mainland area 2½ sq miles forms part of the Colony together with the adjacent New Territory. The whole Colony has an area of about 345 sq miles.

Vital Statistics—Exceptional difficulties are encountered when attempts are made to estimate annually the population of Hong Kong owing to the fact that the Colony is so close to the mainland of China and that no effective control of immigration or emigration exists, it may be taken for granted that with the exception of actual census years inter-censal estimates are unlikely to be accurate. These matters are discussed at length in the body of the Report and again in an Appendix by the Registrar-General who believes the 1938 population might number approximately 1,455,493. Various methods of estimation are described tried and the results compared and all testify to the unusual difficulties attending this branch of vital statistical technique. The system of vital registration in force is commented upon and again attention is directed to the incompleteness of birth registration in the Colony.

In an Appendix to the Report under review the Registrar-General presents the vital facts for 1933 in considerable detail the principal demographic data may be summarized as follows—

*Estimated Populations in various parts of the Colony
(Exclusive of refugees of all classes)*

Item	Hong Kong	Kowloon	New Territories	Maritime	Colony Totals
Non-Chinese	9,871	11,361	492	1,372	23,096
Chinese	444,138	352,849	108,536	100,000	1,005,523
Totals	454,009	364,210	109,028	101,372	1,028,619

Births Deaths and Infant Deaths

Item	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	LMR.
Non-Chinese	558	24.2	244	10.6	23	42.0
Chinese	35,335	35.1	38,574	38.3	11,620	343.0
Totals	35,893	34.9	38,818	37.7	11,643	324.4

(Birth and Death rates calculated on basis of estimated mid year populations)

European Officials resident numbered 1,042 with an average number resident of 833. Five invalidings and five deaths were recorded during the year.

The Medical Staff (European) comprises a Director of Medical Services (Dr P. S. SELWYN-CLARKE M.C.) a Deputy Director of Medical Services a Senior Medical Officer 20 Medical Officers (including Specialist Officers 3 Lady Medical Officers and a number

of Consulting Physicians and Surgeons) In addition there appear to be 18 Chinese Medical Officers of various grades and 4 Chinese Lady Medical Officers.

Maternity and Child Welfare Work—Accommodation for maternity cases in the Colony totals 373 beds and in addition private maternity homes are able to accommodate a large number of cases of these private establishments 88 were inspected during the year At Government Hospitals 4,422 cases, and at Chinese Hospitals 6,807 cases, of normal labour appear to have been dealt with. *Anti-malarial and infant welfare work* is carried out at a large number of centres hospitals and dispensaries the Medical Department employs 16 midwives who are stationed at the various dispensaries. Free service is given by these midwives and very large numbers of women and infants are competently looked after in this way. Synthetic milk continued to be given daily at Government centres to nursing mothers and their babies and the soup kitchen at each centre also supplied 100 free meals per day At the end of the year there were 712 names on the Midwives Register 54 candidates successfully passed the examination carried out under the auspices of the Midwives Board.

The Report supplies full details of the volume of work dealt with and in an Appendix the Professor of Obstetrics and Gynaecology Hong Kong University contributes an account of the maternity and gynaecological cases treated by the Obstetrical and Gynaecological Unit at the Queen Mary and Tsan Yui Hospitals.

School Hygiene—The staff of the School Hygiene Branch of the Medical Department remains as previously described (see this *Bulletin*, 1939 Supp. p. 213). The schools of the Colony comprise 21 Government Schools with 6,410 children, 299 *Grant-in-Aid* Schools attended by 31,924 children, and 929 Private schools attended by 65,800 children. During the year 6,196 children at 19 of the Government Schools were medically examined dental defects and visual disorders were the conditions most frequently noted. Upwards of 3,000 attendances for treatment were recorded at the 3 school clinics during the year and the school nurses paid 205 visits to the homes of children to advise about minor ailments. It is said that the hygienic condition of many of the private schools is poor and that the majority of the children showing physical defects are those attending the private schools. Existing legislation relating to school hygiene is imperfect but it is hoped that a new School Health Code drafted in collaboration with the Director of Education will become effective in 1939 (see this *Bulletin* 1939 Supp. p. 214).

Public Health Sanitation etc—The prolongation of Sino-Japanese hostilities continued throughout the year to drive poverty-stricken and starving refugees to seek a haven in Hong Kong. In November there was a sudden rise in the numbers of these unfortunate people crossing the frontier owing to the extension of hostilities to South China. Measures of control and for the inspection of these immigrants, proved inadequate and smallpox was introduced during this November influx of refugees. *Anti-malarial work* continued to be carried out by the Malaria Bureau and malaria is now limited to the outskirts of towns and the country districts. The work carried out by the Bureau during 1938 is described in a report contributed by the Government Malariologist.

The unsatisfactory system of *sewage disposal* for the bulk of the premises in Hong Kong referred to in this *Supplement* a year ago

is again the subject of strong criticism. Direct sewer disposal into the sea or by means of sewage works based on the activated sludge and aeration bed principle are suggested as desirable methods of disposal replacing the present objectionable system. The extension of incineration as a means of refuse disposal is recommended as highly desirable. Water supplies were described in these pages a year ago (see this *Bulletin* 1939 Supp p 215*). It remains to say that the addition of about half a million refugees to the normal population in conjunction with an unusually low rainfall produced a disquieting situation and restrictions were imposed. Additional supplies were laid to the refugee camps by the P.W.D. Arrangements were made for the chlorination of all Government water supplies as a safeguard against possible infection with water borne diseases.

The report of the *Housing Commission* is receiving the close attention of Government. Meanwhile the congestion of the urban districts in Hong Kong continues unabated. Health Officers and Sanitary Inspectors undertake the duties of house-to-house inspection but the existing system (described in this *Bulletin* 1939 Supp pp 214*-215*) is unsatisfactory and reorganization of the inspectorate on more effective lines is hoped for in the near future. *Labour conditions* are generally unsatisfactory conditions were aggravated in 1938 by the arrival of refugees who sought work in the Colony. A special labour officer was appointed to investigate conditions and to advise on legislation. Itinerant hawkers of foodstuffs continued to provide one of the most difficult problems of public health in the Colony. In view of the recurrence of cholera and the presence of certain intestinal infections legislation was introduced restricting the sale of various foods and drinks. An enlarged *Nutrition Research Committee* was appointed in 1938 to investigate nutritional problems in the Colony. The Superintendent of the Botanical and Forestry Department contributes observations upon the agricultural policy of the Colony which has of course a distinct bearing upon the problem of nutrition. The inspection of health conditions in markets continues to be undertaken by the colonial veterinary surgeon (see also this *Bulletin* 1939 Supp p 215*).

Courses are provided for the *training of sanitary personnel* eleven candidates were successful at the examination held in Hong Kong in 1938 for the Sanitary Inspector's Certificate of the Royal Sanitary Institute.

Recommendations for future work include the following: (a) That the sanitary inspectorate shall be brought under the direct control of health officers. (b) Appointment of a Deputy Director of Health Services and increases in staff of health officers. (c) Extension of main sewerage systems. (d) Establishment of a School Dental Service. (e) Establishment of health centres in urban and rural areas.

Port Health Work—The volume of work dealt with during the year may be summarized as follows:—

British vessels entered and cleared	3 996
Foreign	3 132
Other vessels	17 542
Total tonnage of all vessels	29 530,384
Emigrants examined	124 186
Emigrants rejected	360
Total persons examined on arrival	1 115 067
	(average 3 055 per day)

It will be noted that the continuance of Sino-Japanese hostilities seriously affected the volume of shipping calling at Hong Kong and that the numbers of river steamers, foreign trade junks, etc. (Other vessels above) also showed an appreciable decline. The Vaccination Ordinance was rigorously enforced against all passengers arriving and 348,444 persons were vaccinated in addition 13,657 people were inoculated against cholera by port health officials.

With regard to arial traffic it is noted that a new air service (Air France) commenced to operate during the year and there are now six companies making regular calls at Hong Kong details of this traffic read as follow:—

Arrivals	Departures.
633	649
2,402	2,447
6,006	3,963

Aircraft numbers of
Crew
Passengers

Hospitals Dispensaries etc.—In the preceding Annual Report hospitals and dispensaries in the Colony were commented upon at some length see this Bulletin 1939 (supp. p. 218*) Hong Kong hospitals have a salable for general purposes a total of 2,000 beds assuming a population of about 1,250,000 persons and allocating 5 hospital beds per 1,000 population it will be seen that 6,250 beds should be a salable to meet normal requirements. The year under review was by no means a normal year for the population had been greatly increased by the influx of nearly half a million refugees, many of them diseased and poverty stricken, with the result that the hospitals were dangerously overcrowded. The Chinese hospitals were especially affected. To meet the pressing needs of these exceptional conditions, Government sanctioned the construction into a rebel hospital of buildings originally erected to house emigrant Chinese labourers and subsequently used as a prison. Three new wards were opened at the Infectious Diseases Hospital and as a further means of meeting the urgent demands for beds in the Kwong Wah Hospital (Chinese) military marquees were obtained on loan and when erected provided shelter for between 75-100 patients. The shortage of hospital facilities gave rise to deep anxiety and Government appointed a special Committee to advise on actual needs and how they might be met.

To Government Hospitals 20,404 patients were admitted, 21,078 were treated and 1,763 died during the year under review (see this Bulletin 1939 Supp., p. 218*)

The year 1938 was the first complete calendar year in the history of the Queen Mary Hospital (see this Bulletin 1939 Supp., p. 218*) In patients treated for general conditions numbered 10,117 and among these cases 686 deaths were recorded. In addition there were 702 maternity cases with only 3 deaths. Out-patients numbered 2,554 At the Kowloon Hospital in-patients numbered 3,524 and there were 292 hospital deaths. 1,905 patients were treated in the Maternity block and three women died in childbirth. Out-patients seen during the year (including those attending special clinics) totalled 105,834 At the Tauxi Lok Maternity Hospital 2,096 maternity cases were dealt with and there were 10 maternal and 88 infant deaths recorded. In addition out-patients seen included 575 new ante-natal and 1,348 infant welfare cases.

At Government Dispensaries 118,050 patients were treated. Chinese Hospitals and Dispensaries are again discussed at length (see this Bulletin 1939 Supp. p. 218*) An agreement of first rate

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public health importance was reached during the year when the Medical Department succeeded in obtaining (in the face of considerable opposition) the Chinese directors of the hospitals to consent that all cases of notifiable diseases shall be treated in Western isolation wards by properly qualified medical practitioners. There appear to be 4 Chinese Hospitals and 9 Chinese Public Dispensaries in the Island and Kowloon. To all Chinese Hospitals 49 357 patients were admitted, 50,895 were treated and 13 635 patients died. In addition 597 225 out-patients were dealt with at the Chinese Public Dispensaries 275 423 new and 250,907 old cases were treated.

The year under review was characterized by the prevalence and persistence of infectious disease in the Colony. In addition to valuable textual commentaries the frequent bar diagrams presented in the Report illustrate clearly the incidence of the principal diseases recorded in the Colony in 1938.

The *smallpox* epidemic during the year was the worst in living memory and was responsible for 1,833 deaths. The epidemic which began in November 1937 reached its peak in March 1938 thereafter declined rapidly and only 5 cases were reported in July. Total cases recorded during 1938 numbered 2,327 with a mortality rate of 79 per cent. Compulsory vaccination was introduced, free vaccination centres were opened, and a vigorous anti-smallpox campaign was instituted altogether 1 035 448 vaccinations were performed the vaccine lymph used being prepared locally at the Government Bacteriological Institute. In an Appendix to the Report details of the 834 cases treated in hospitals and a detailed account of the outbreak are given. Another Appendix reproduces a rough translation of a radio broadcast talk by a distinguished Chinese citizen and provides an interesting sidelight on the popular reasons advanced to account for the cause of the outbreak, i.e. the influence of gunpowder and the bodies of persons killed in action.

Cholera was widespread throughout the Far East during 1938 and the disease made its appearance in Hong Kong in the month of May spread rapidly in June and attained its peak during the third week in July. Thereafter it declined rapidly though cases continued to occur right up to the end of the year. Altogether 547 cases with 363 deaths were recorded. The outbreak was aggravated by the steady stream of refugees into the Colony and by the existing overcrowded housing conditions. A full description of the outbreak and of the rigorous control measures adopted are presented in an Appendix to the Report under review.

No case of *plague* was reported. Daily examinations of dead rats are made and spleen smears are made each day from a number of them. *P. pestis* was not evident in any of these smears. The usual anti-rat measures were systematically carried out during the year.

Cases of *cerebrospinal meningitis* occurred sporadically throughout the year. A sudden sharp rise in the number of cases occurred after the influx of refugees in November 1937. During the year under review incidence increased steadily from January with March and April as the months of greatest prevalence. 483 cases were reported (113 in April) with 223 deaths. *Typhus* occurred in epidemic form in several parts of Northern China during the spring of 1938 but Hong Kong was fortunate in having only two non fatal cases during the year. One was a naval rating who appears to have become infected

in Shanghai the other was a young refugee who also arrived from Shanghai.

The Report observes *Malaria* thanks to the untiring zeal and indefatigable activity of the Malaria Bureau is no longer to be regarded as one of the major killing diseases in Hong Kong. Deaths due to this cause numbered 733 only an increase of 34 on the 1937 figures despite the arrival of tens of thousands of refugees from malarious districts. Cases treated in Government and Chinese Hospitals were distributed as follows —

Hospitals	Benign Tertian	Quartan	Sub- tertian	Cachexia	Un- defined	Totals	
						Cases	Deaths
Government	205	14	335	99	86	729	25
Chinese	478	10	1 789	37	—	2,314	483

No case of *blackwater fever* was reported. At the Government Bacteriological Institute 8 718 blood films were examined for the presence of malarial parasites and 3 450 gave positive findings. Of the latter 1 614 were *subtertian* 1,278 *benign tertian* 138 *quartan* 68 were multiple infections, and 354 were unclassified. The work of the Malaria Bureau during 1938 is described in detail in an Appendix to the Annual Report under review.

Ferers of the enterica group were responsible for 539 cases and 187 deaths the disease in the majority of cases being due to *Bact. typhosum* infection. The months of maximum incidence were June and July with 79 and 92 cases respectively. In Government Hospitals 114 cases of typhoid (37 deaths) and one case of paratyphoid were treated and in Chinese Hospitals 182 cases of typhoid (86 deaths) and 2 of paratyphoid. At the Bacteriological Institute 2,109 samples of serum were examined and 519 were positive for one or other of the agglutinins of the enterica group viz *Bact. typhosum* 430 *Bact. paratyphosum* A 2, *Bact. paratyphosum* B 11 and type undetermined 76. Among 4 130 faecal specimens cultured for pathogenic organisms 183 contained *Bact. typhosum*.

Dysentery was rife throughout the year. 1 071 cases were recorded with 338 deaths. The maximum number of cases was reported in June with 124 but 123 were reported in July and there were further though slightly lower peaks in September and November. In hospitals 782 cases were treated with 229 deaths the distribution of these cases with types of infection being as follows —

Hospitals	Amoe- bac	Deaths	Bacil- lary	Deaths	Un- defined	Deaths	Totals	
							Cases	Deaths
Government	3	2	129	11	4	1	139	14
Chinese	43	14	675	201	28	—	946	215
Totals	46	16	704	212	32	1	782	229

At the Bacteriological Institute 4 130 stools were cultured. 743 presented the typical cytological picture of *Bact. dysenteriae* 45 were *Bact. dysenteriae* Flexner 1 Shiga, and 5 Schmitz infections.

Pulmonary tuberculosis killed 4,920 people during the year or in other words approximately one in every eight deaths occurring in Hong Kong was due to this disease. Tuberculosis is not notifiable and infectious cases still remain in close contact with their fellows. Chinese tenements are dangerously overcrowded many of the people live on an inadequate and ill balanced diet are addicted to the spitting habit and their hygienic standards are of the very lowest. Attempts are being made to improve housing conditions legislation for the compulsory pasteurization of milk was introduced during the year and the question of making spitting in public places illegal is under consideration. The provision of adequate hospital accommodation for all persons suffering from open tuberculosis is urgently needed. Meanwhile cases treated in hospitals may be classified as follows —

Disease	Government Hospitals		Chinese Hospitals		Totals	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Pulmonary tuberculosis	377	71	3 725	1,879	4 102	1,950
Other forms of	150	54	416	238	546	292

At the Bacteriological Institute 822 specimens of sputum were examined and 232 were positive with *Mycobacterium tuberculosis*. With regard to other respiratory affections the following statement is a record of cases treated in hospitals during the year —

Disease	Government Hospitals		Chinese Hospitals		Totals	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Bronchitis (all forms)	215	10	3,582	785	3,827	775
Broncho-pneumonia	167	108	3,234	2,446	3 401	2 654
Pneumonia	97	49	1,358	550	1 455	559

Helminthic diseases do not figure prominently in the hospital returns, though the view is expressed it is probable they are much more widespread than these figures indicate. Thus in Government Hospitals 88 in patients were treated for *ascariasis* 71 for *ankylostomiasis* 15 for *clonorchiasis* 7 for *taeniasis* and 2 for *filariasis* and in Chinese Hospitals the corresponding figures read 70 37 3 5 and 3 respectively. Following the examination of 3 632 stools for the presence of intestinal parasites the Bacteriological Report calls attention to the fact that the positive findings were nearly three times as great as those observed in the preceding year the findings included *Ascaris* 285 times *Clonorchis* 243 times *Trichuris* 112 times hook worms 111 times and multiple infestations 244 times.

Accurate information about the incidence of *leprosy* in the Colony is difficult to obtain but steps were taken during the year which should enable the authorities to deal with this problem with greater certainty than heretofore. In the first place arrangements were made with the approval of Government to give financial aid to the Mission Leper Settlement at Sheklung in Chinese Territory and secondly Government

acquired the former Tung Wah Infectious Diseases Hospital which accommodated lepers. A great increase in the numbers of admissions occurred during the last three months of 1938 no doubt largely due to the Japanese invasion of South China. According to Hospital Returns 349 lepers were under treatment as in-patients during the year. At the Bacteriological Institute 108 nasal and other scrapings were examined and 63 were positive with *Myco. leprose*.

Veneral Diseases—Work was continued at the established centres along lines previously described, the attached summary indicates the extent to which the public makes use of available services—

Centre	New Cases		Attendances	
	M	F	M	F
Queen's Road	1,063	544	4,840	2,311
Violet Peel Health Centre	1,602	732	8,475	4,533
Kowloon Dock	2,238	473	11,405	2,164
Kowloon Hospital	574	789	1,350	2,355
Tai Po Centre	19	1	273	40
Un Loong Centre	13	3	54	7
Totals	6,379	2,642	26,902	12,349

In-patients treated at Government Hospitals for syphilis numbered 121 and for gonococcal infections 325 the corresponding figures for Chinese Hospitals being 91 and 52 respectively.

The Health Officer Social Hygiene and his assistants examined 4,941 urethra for gonococci and took 12,062 specimens of blood for the Wassermann reaction. At the Bacteriological Institute the Kahn test was applied to 17,111 samples of serum and positive reactions were recorded in 4,229 cases also 1,115 urethra were examined for the presence of the gonococcus but findings are not recorded.

Other Diseases—Of diphtheria 319 cases were notified and 147 deaths were ascribed to this cause. Scarlet fever continues to be a rarity in the Colony only 4 cases were notified during the year. Among the diseases mentioned in the classified hospital returns for in-patients responsible for considerable disability it is noted there were 5,600 cases of beriberi with 1,885 deaths, 3,988 cases of diarrhoea and enteritis with 1,685 deaths (892 cases and 599 deaths among children under two years of age) and 2,144 cases of nephritis with 638 deaths.

Scientific—Under this heading four separate Reports are presented viz. (a) *The Report of the Bacteriological Institute* which records in great detail the year's work of this Institution. The resources of the staff were strained to the utmost by the occurrence of epidemics of smallpox and cholera, demanding the production of large quantities of prophylactic preparations. During the year 41,710 specimens of various kinds were examined the principal specimens dealt with and findings recorded have been the subject of brief mention in the preceding notes.

(b) *The Annual Report of the Malaria Bureau* deals entirely with work carried out during 1938 and makes no reference to previous research or extensive routine anti-malarial activities.

(c) *The Report of the Analytical Laboratory* describes the nature and volume of work dealt with under various headings. Government

work involved the examination of 3 679 samples and semi-official and non-official work accounted for an additional 533 samples

(d) *The Report of the University Professorial Units* presents the separate reports of the Professors in charge of the Medical Surgical and Obstetrical and Gynaecological Units respectively

The Annual Report under review also contains eight Appendices carrying the following titles —

- 1 Drug addiction and the drug traffic in Hong Kong
2. Refugee relief in 1938
- 3 Smallpox in Hong Kong in 1938
- 4 A talk by Mr Ho Kam Tong O.B.E. on the importance of being vaccinated
- 5 Cholera in Hong Kong in 1938
- 6 List of diseases treated in Government Hospitals.
- 7 List of diseases treated in Chinese Hospitals.
- 8 Report of the Registrar-General of Births and Deaths.

Financial—Medical Department expenditure amounted to \$2 407,347 but including expenditure on Sanitary Services Public Works water and drainage etc. during 1938 the total sum amounts to \$5 451,990 or 14·7 per cent. of the total revenue of the Colony during the same year

PACIFIC OCEAN

Fiji and Western Pacific (1938)

The Colony of Fiji comprises some 200 to 250 islands of volcanic origin in the south Pacific Ocean (many merely uninhabited islets and rocks) lying between 15° and 22°S latitude and longitudes 177°W and 176°E. Sydney is about 1 700 miles distant and Auckland 1 100 miles. The Tongan or Friendly Islands lie 160 miles to the south east and Samoa 500 miles to the north-east. The principal inhabited islands are Viti Levu with an area of 4 083 sq miles, Vannalovu 2,130 sq miles, Tavuni 217, Kadavu 124, Kororua 88, Gau 43, Ovalau 43, Rotumah 14 sq miles. The total area of the Colony is 7 083 sq miles (nearly that of Wales).

Vital Statistics—The relevant facts may be set out as follows—

Race	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M R.
Europeans	4 185	56	13.3	33	9.1	5	89.3
P. M. E. M. D.	4 879	163	32.4	33	7.2	9	57.0
Fijians	101,285	3,811	37.6	2 121	20.9	408	107.1
Rotumans	2,907	129	43.8	77	25.9	18	139.5
E. Indians	97,309	3 648	36.8	1 034	11.2	230	76.8
Polynesians	1,637	21	12.8	49	29.9	5	235.1
Chinese	1,979	34	17.2	17	8.6	7	7
Others	1,274	122	96.8	17	13.3	10	82.0
Totals	210,516	7,879	37.9	3,385	16.1	735	92.1

Persons of Mixed European and Native Descent.

European Officials resident numbered 431 with an average number resident of 345. Four were invalided and two died. Of *Non European Officials* 685 were resident with an average number resident of 615 within this group one was invalided and three died.

The *European Medical Staff* comprised a Director of Medical Services (Dr V. W. T. McGarr), an Assistant Director of Medical Services, and 19 Medical Officers (these include special appointments). In addition there are 86 Native Medical Practitioners and 7 Indian Medical Practitioners.

Maternity and Child Welfare Work.—The references are somewhat scattered in the Report under review and the information relating to maternity work is meagre. In the Obstetric Ward of the Colonial War Memorial Hospital 285 women were delivered of their babies and 240 births were recorded.

The *Fijian Infant Welfare* was transferred to the Medical Department in January 1939 though close co-operation will continue to be maintained with the Native Administrations in the essential interests of the work. After 12 years of concentrated effort no appreciable improvement in the Fijian infant mortality rate has been achieved, and the view is expressed that the high infant death rate must be attributed to a low standard of motherhood in the Fijian women associated with more or less general racial malnutrition. It is realized that the remedy must be sought in moral as well as material measures. The assistance of the Christian Missions has been invited and readily given for the attack upon these obstacles to progress which are psychological as well

as social in their nature. There are 5 European and 15 Native Nurses employed in connexion with the Fijian Infant Welfare Scheme and 37 Obstetric Nurses (Native) at work in the Colony as a whole.

School Hygiene—The Report under review supplies no information under this heading. The only statement in which the word school or school-children is mentioned is the following—

Public Health Education of the general community includes all school children and is undertaken as part of the duties of all public health and school officials supported in most cases by Government Administrative officers. Experience is showing that if the public health education of young children of the peasant classes is to be effective it must be reduced to the simplest and most practical terms.

Public Health Sanitation etc—The curative and public health services are jointly controlled by the Director of Medical Services. organization has been described in previous issues of this Supplement (see this *Bulletin* 1939 Supp p 222*). The *sanitary services* of the port town and environs of Suva are described at length in a special report. Suva alone has a system of water borne *sewage* while a relatively small though increasing number of other places have septic tank installations. A special soil sanitation campaign has aims at the provision of an adequate number of suitable latrines for the whole population. Experience has shown that the bore-hole latrine is suitable for individual households and for communal use a pit latrine was found essential. the former type is in general use among the Indian peasantry and the latter is common to the Fijian villages. *Water supplies* and measures taken for the control of the manufacture and sale of *foods and drinks* are referred to in the Report of the Medical Officer of Health for Suva and relates only to that township. The Report reproduces excellent photographs of insanitary areas of the striking improvements effected following the application of the new Public Health Regulations which came into force in 1937 and of equally striking improvements which have taken place in the replacement of old type small dwellings by modern houses.

The *training of sanitary personnel* has continued. It is proposed to seek the assistance of the Royal Sanitary Institute to arrange for holding local examinations for candidates to qualify for employment as members of the sanitary staff.

Port Health Work—The Port Health Officer reports that 155 overseas vessels were boarded and 3 393 passengers and 2 887 members of crews were medically examined. The usual anti plague and anti-rat measures were carried out. the compulsory fumigation of local vessels has been the means of reducing not only the rat population, but also of cockroaches and other vermin.

Hospitals Dispensaries etc—A new Nurses Home and a new Children's Ward were opened at the Colonial War Memorial Hospital. For the rest hospitals remain for all practical purposes as described in previous issues of this Supplement. The detailed report of the year's work at the Colonial War Memorial Hospital presents illustrations of the hospital and Nurses Home. There is an effective chain of 31 *dispensaries* scattered throughout the whole country. Most of them are staffed by Native Medical Practitioners and a few by Indian Medical Practitioners all with few exceptions supervised by European Medical Officers. there are in addition of course the out patient departments connected with all hospitals.

At all institutions 12,334 in-patients were treated with 702 deaths and there were 121,558 out-patients the latter figure does not appear to include dispensary out-patients.

Medical Education is described in a Report contributed by the Principal (Dr D W HOODLESS) of the Central Medical School. In the Nurses Training School there is local provision for training two grades of nurses viz for the certificate of general nursing and for the diploma of Native Obstetric Nurse.

Notifications of *enteric fever* numbered 213 and 24 deaths were ascribed to this cause. The disease commonly occurs in low lying agricultural areas lacking protected water supplies and the usual sanitary amenities. *Dysentery* of which 1,834 cases with 95 deaths were reported occurred in epidemic form in one district only during the early part of the year but later in the year the disease became more widespread. At the Laboratory where 960 faecal specimens were examined, positive findings included Flexner bacillus 118 Shiga 40 Sonne 15 and Shigella 11.

The 372 cases of *tuberculosis* notified during the year (with 58 deaths) are not to be regarded as an accurate indication of the prevalence of the disease. Of the 372 cases recorded 322 were of the *pulmonary* form of the disease which is almost as common among Indians (128 cases) as among Fijians (181 cases). The Report contains an account of a tuberculosis survey by a Native Medical Practitioner and also a Memorandum by the Director of Medical Services under the title of "The Problem of Tuberculosis in Fiji". At the Laboratory 330 specimens of sputum were examined for the presence of *Mycobacterium tuberculosis* but findings are not recorded. Other notifications received included 307 cases of *broncho-pneumonia* and 180 of *lobar pneumonia*.

Ancylostomiasis is endemic in Fiji, is constantly present along the river valleys and in the wet regions but is not markedly prevalent in the mining areas. Cases recorded numbered 1153. The district distribution of cases emphasizes the need for proper latrine provision in the areas principally affected (see also this Bulletin 1939 Supp., pp. 222* and 224*). At the Laboratory among 1125 faecal specimens examined 272 were positive with *ancylostoma*, 58 *ascaris*, 57 *oxyuris* and 30 with *trichuris*.

Leprosy—An outstanding feature of each Annual Medical Report for Fiji is the very excellent report contributed by the Medical Superintendent (Dr C. J. AUSTIN) of the Central Leper Settlement, Makogai. This Report has been reviewed at some length in this Bulletin 1940 Vol. 37 p. 628 and to that account the reader is referred. For present purposes it may be said that 135 lepers were admitted during the year 38 died, 53 were discharged and that 618 patients were under treatment during 1938. This special report by Dr AUSTIN discusses such matters as *Race in Relation to Type of Leper*, the *Distribution of Leprosy in Fiji*, *Treatments* and results of treatment, etc. Of this Settlement a distinguished Medical Visitor is reported to have observed "Makogai is the best leper Settlement in the world."

Veneral Diseases (undifferentiated) gave rise to 347 notified cases. Hospital returns show that 20 in-patient cases of *sypilis* and 143 of *gonococcal infections* were treated during the year. *Sypilis* is relatively uncommon and no case appears to have been reported in a native Fijian. On the other hand increasing industrial development in recent years has provided opportunities for infecting Fijians with *gonorrhoea* which, however usually runs a mild course. It is suggested

there may be some connexion between this fact and the habit common to all South Sea Islanders of drinking *kava* a beverage which possesses both diuretic and astringent properties. *Yaws* is said to have become a relatively rare disease 3,236 cases were reported.

Among other diseases mentioned in the Report occur 189 cases of *trachoma* 543 of *whooping cough* 57 of *chickenpox* and 15 of *dengue fever*. *Filarial elephantiasis* is common in certain districts.

Dr S M LAMBERT contributes the usual *Annual Report on the Western Pacific Health Service*. This report is mainly devoted to presenting a detailed account of the general survey of Fijian diseases carried out during the year the most important section of the work being concerned with an account of the incidence and distribution of tuberculosis. All persons examined were tuberculin tested, the numbers examined and the results recorded being tabulated for each district in 15 age-groups for each sex. Out of a total population of 8 110 persons 54 per cent were tuberculin positive in the same population 61 were positive clinically for pulmonary tuberculosis and 32 positive by sputum. Other facts recorded during the survey showed among this population 256 cases of various eye affections 65 cases of *elephantiasis* 49 cases of *yaws* and that in general dental conditions show considerable deterioration probably due to dietary changes attendant on the process of native adjustment to western life.

Scientific—The work of the Laboratory is described by Dr C M MACPHERSON Government Pathologist. During the year 5 783 specimens were received for examination some of the principal specimens dealt with and findings recorded have been mentioned in the preceding notes but it remains to add that 232 Kahn tests were carried out 510 throat swabs were examined for *C diphtheriae* 81 agglutination tests were performed and that other work included the examination of large numbers of samples of water milk, wines etc. and the preparation of vaccines. In spite of the heavy demands made by routine work some attention was devoted to the question of nutrition though this work cannot be continued until additional help is available.

Financial—The total expenditure on all medical services during 1938 amounted to £93,825 a sum which represents 9.6 per cent of the total expenditure of the Colony during the same year.

British Solomon Islands Protectorate (1938)

The British Solomon Islands Protectorate is situated between the parallels of 5°S and 12°30'S and the meridians of 155° and 170° of E. longitude. It consists of Guadalcanal, Malaita, San Cristoval New Georgia, Ysabel and other islands east of New Guinea with a total area of about 11 458 sq miles.

Vital Statistics—The population in round numbers remains unchanged viz Europeans 500 Asiatics 200 Natives 94 000. Births and deaths are given for five Districts only (see this Bulletin 1939 Snpp p 226*) the totals being, births 749 and deaths 616. Eight non native births (one European) and 2 deaths (one European) were recorded.

The labour population numbered 3,993 within this group 22 deaths occurred respiratory affections being responsible for 12 deaths.

European Officials resident numbered 42 with an average number resident of 32 no invalidisms or deaths were recorded.

The Medical Staff (European) in 1938 comprised a Senior Medical Officer (Dr H. B. HETHERINGTON) a Medical Officer and a Yaws and Hookworm Officer there were also 5 Native Medical Practitioners. (There are 5 non-Government Medical Practitioners in the Islands—two attached to Missions and three employed by commercial undertakings)

Public Health Sanitation etc—From the health point of view 1938 is reported to have been a satisfactory year. The usual routine *anti-malarial measures* were continued. No changes in methods of *sewage or refuse disposal* or in sources of *water supplies* are noted (see this Bulletin 1938 Supp pp. 225*–226*) The general health of *labourers* was satisfactory a new ration scale was introduced and it is anticipated that with this scale in use *beri-beri* will completely disappear.

Training of Medical and Sanitary Personnel—The Protectorate had three students at the Central Medical School Suva the training of one student was discontinued another graduated as a Native Medical Practitioner Two other natives are receiving preliminary education prior to entry to the Central Medical School One native was trained as a village dresser at the Tulagi Hospital

Port Health Work.—No quarantinable diseases reported During the year 53 vessels entered the three ports in the Protectorate

Hospitals Dispensaries etc—There are five *Government Hospitals* in four of which natives only are treated. Admissions to all Government Hospitals numbered 1 447 those treated 1 517 and 28 patients died of the total treated 54 were Europeans, 19 were Asiatics, and the remainder natives. With regard to out-patients at the Tulagi Hospital these averaged daily 23 and at the four Native Hospitals general treatments to out patients numbered 6 663

A new vessel for the Medical Department is being built locally (see this Bulletin 1937 Supp p 217*)

There are three *Mission Hospitals* in charge of Medical Officers subsidised by the Administration These institutions are reported to have done excellent work, but no details of patients treated are supplied.

Malaria was responsible for 9 European (10 treated) 2 Asiatic, and 68 Native admissions to the Tulagi Hospital, and there were also one Asiatic case and two Native cases (one death) of *blackwater fever*

Tuberculosis is widely prevalent among the native population at present control can only be attempted by improving the dietaries and general sanitary and living conditions of the people During the year there were 14 admissions for all forms of the disease with 5 deaths of the total cases one Asiatic and nine Native patients were suffering from *pulmonary tuberculosis* (4 deaths among Natives) Other *respiratory affections* treated at the Tulagi Hospital included 4 cases of *bronchitis* and 17 cases of *pneumonia* (all forms)

Epidemics of *influenza* were prevalent in various parts of the Protectorate the disease was responsible for 77 Native admissions (85 treated) to the Tulagi Hospital but no deaths occurred.

Bacillary dysentery is endemic and continues to exist in sporadic form A small epidemic occurred in the Eastern Solomons Districts and the deaths of three old natives were reported. At the Tulagi Hospital one European one Asiatic, and ten Natives were treated for bacillary dysentery one Asiatic for amoebic dysentery and one native

for chronic dysentery. One native died. *Other digestive diseases* were responsible for 24 in patient cases and of these 17 were native patients.

The Yaws and Hookworm Campaign was continued among the native population the Field Unit concentrating attention on Malaita the most populous island in the Protectorate. During the year 9,530 persons were examined on Malaita and a *yaws* infection rate of 37·9 per cent. established. mass treatments for hookworm were carried out co-incidentally with yaws treatments the number of treatments totalling 7,219. Treatment for yaws and hookworm was also given at all hospitals etc. in the Protectorate (see this *Bulletin* 1939 Supp p 228*)

Leprosy—The Leprosy Survey carried out by Dr James Ross INNES (see this *Bulletin* 1939 Supp p 228*) is described at some length in an Appendix to the Report under review. Briefly 21 615 persons were examined and 221 lepers were discovered, and it is estimated there may be approximately 900 lepers in the Protectorate. details of local distribution age sex, and birth-places of lepers are supplied. A full report of the Survey may be obtained from the Government Printing Press Suva Fiji.

Veneral Diseases—No cases of *syphilis* were seen but nine native patients were admitted to the Tulagi Hospital for *gonorrhoea* all being the members of crews of vessels. It is said that *granuloma venereum* is not uncommon.

General—Since the intensive treatment of the natives on Rennell Island (see this *Bulletin* 1938 Supp p 228*) health conditions have improved considerably and the widely prevalent outbreak of *ulcers* arrested. *Diseases of the skin* and connective tissue were responsible for 202 in patient cases (195 were natives) at the Tulagi Hospital and of these 77 (74 natives) were ulcer cases. Two native cases of *cerebro-spinal meningitis* were recorded both terminated fatally. It will have been observed in this Summary that references to morbidity relate to cases treated at the Tulagi Hospital. no details are supplied for the four Native and three Mission Hospitals.

Financial—Total expenditure on Medical and Sanitary Services for the financial year 1937-38 amounted to £10,350 a sum which represents 12·5 per cent. of the total revenue of the Protectorate during the same period.

Gilbert and Ellice Islands Colony (1938)

These islands formerly a Protectorate were annexed to the Empire in November 1915. The Gilbert group lies between 4°N and 3°S latitude and 172° and 177°E. longitude and consists of 16 islands with several small dependent islets. The Ellice Group between 5° and 10½°S. latitude and 176°E and 179 58°W longitude, comprises 9 islands. Ocean Island (Puanopa) is the seat of Government and was proclaimed British in 1900. Fanning Island and to the north-west of it, Washington Island were included in the Colony in 1916 and Christmas Island in 1919.

Vital Statistics—The total estimated population at the end of the year was 33,312 a figure showing a considerable decrease by comparison with the 1937 estimate (see this *Bulletin* 1939 Supp p 229*). Registered births totalled 1 220 and deaths 935. If registration is

complete the resulting crude annual birth and death rates would be 36.6 and 28.0 per 1 000 respectively

The Medical Staff in 1938 comprised a Senior Medical Officer (Dr F. E. MONTAGUE) a Medical Officer and two Medical Officers employed by the British Phosphate Commissioners acting as Government Medical Officers at Ocean Island in addition there were 10 Native Medical Practitioners

Maternity and Child Welfare Work—So far no organized child welfare work has been possible in the Gilbert Islands. There is an increasing tendency for expectant mothers to seek the advice of Native Medical Practitioners when these officers are available in the Ellice Islands native girls are being trained as nurses and are doing good work among their own people. On Ocean Island a special Infant Welfare Centre is provided by the British Phosphate Commissioners for infants of their indentured labourers with a fully trained European nurse working under the direction of the Medical Officer

Public Health Sanitation etc—The general health of the community during 1938 is reported to have been satisfactory. On Ocean Island it is said that sanitation of a high order is maintained during 1939 all existing latrines are to be replaced by a simple pit type provided with concrete slab and cover. Elsewhere methods of sewage disposal remain as described in previous issues of this Supplement. There is no change in arrangements made for the provision of water supplies during 1939 a drought affected some of the Islands causing serious shortage of food. The Report under review describes general living conditions and the construction of native houses and also the usual components of native dietaries

Port Health Work—Nine ships entered the port of Tarawa seven the port of Funafuti, and seventy-eight at Ocean Island one ship arriving from Hong Kong with several cases of dysentery was quarantined for seven days.

Hospitals Dispensaries etc—The hospitals maintained by the Colony Government (see also this Bulletin 1939 Supp pp 229*-230*) include one at Tarawa in the Gilbert Islands one at Funafuti in the Ellice Islands, one on Ocean Island, and 25 Island Hospitals (18 in the Gilbert Islands 7 in the Ellice Islands). The British Phosphate Commissioners also maintain three hospitals on Ocean Island. Patients treated at these institutions were as follows—

Hospital	Admissions	Treated	Deaths	Out-patients (Treatments)
Tarawa	286	283	16	7,583
Funafuti	7	235	1	3 184
Ocean Island	143	166(?)	0	297
Island Hospitals (Gilbert)	7	2 434	7	44,693
(Ellice)	7	780	7	16 044
Brit Phosph Commrs (?)	1 481	1 514	26	5 723

The Medical Department motor vessel is used for the transport of patients from outlying islands to the central hospitals for the repatriation of patients, and for the carriage of supplies to the island hospitals.

Missions—Dispensaries are maintained by the London Missionary Society at Beru and Abaiang

The Colony *Leper Asylum* at Tarawa functions as a collecting centre for lepers in the islands during the year under review 31 lepers were transferred to the Central Leper Asylum at Makogai

To the *Mental Asylum* Tarawa 4 patients were admitted 15 were under treatment 4 were discharged and one died during the year

With regard to *morbidity experience* during the year mild outbreaks of *influenza* are again reported 10 cases were admitted to Tarawa Hospital, 163 to Funafuti 496 were treated at British Phosphate Commissioners Hospitals and 17 at the Government hospitals on Ocean Island

On Ocean Island a number of cases of *beriberi* continue to occur among labourers and Banabans 39 cases are quoted in the hospital returns and 8 deaths were ascribed to this cause

Tuberculosis—Cases continue to occur but tubercular affections are becoming less of a scourge in the Gilbert Islands. On the other hand during 1938 tuberculosis assumed serious proportions among native labourers of the British Phosphate Commissioners 25 cases are mentioned in the B.P.C. returns and of 12 deaths among labourers 10 were due to this cause Among other *respiratory affections* mentioned in the classified returns are 10 cases of *pneumonia* and 54 cases of *bronchitis*

The incidence of *filariasis* continues to be high in the Ellice Islands, and *filarial hydrocele* and *elephantiasis* are said to be common On five islands in the Gilbert group blood examinations were carried out Tarawa Island showed a 17.2 microfilaria infection by night and 3.5 per cent by day Marana 6.5 per cent in both day and night bloods at Abalang one positive among 300 and at Butaritari one out of 908 examined and at Makin no positives among 414 examined.

Cases of both types of *dysentery* are common faulty methods of disposal of excrement and the fly nuisance being largely responsible Classified returns show that 87 cases were treated in Government hospitals and 98 in the B.P.C. hospital. In general natives suffer from the amoebic and Chinese from the bacillary form of the disease.

Syphilis does not occur in the Colony cases of *gonorrhoea* occur but without harmful sequelae *Yaws* is well controlled—natives present themselves voluntarily for treatment cases of severe secondary yaws are rarely seen. The only cases mentioned are 17 treated in Government hospitals and one in the B.P.C. hospital injections given at the Island Hospitals totalled 9,253

The usual *Medical and Sanitary Report for Ocean Island* appears as an Appendix to the Report under review (see this *Bulletin* 1939 Supp. p. 231*) The salient features have been incorporated in the above summary

WEST ATLANTIC

BAHAMAS (1938)

The Bahamas are a chain of coral islands lying between 21° 43' and 27° 34' N latitude and 72° 40' and 78° 57' W longitude and are the most northerly of the British West Indian Colonies, with the coast of Florida to the north-west and Haiti to the south-east. There are about a score of inhabited islands, of which New Providence is the chief and contains the capital, Nassau. The total area of the archipelago is 4 404 sq miles, or about half that of Wales.

Total Statistics—In the following Table the relevant facts for 1938 are summarized—

Estimated Population	Live Births	Birth Rate	Still-births	Deaths	Death Rate	Infant Deaths	Infant Mortality Rate
67 720	2 020	29.8	128	1 222	18.0	289	128.7

In the Report under review the *Birth rate* is given as 33.8 per 1 000 though how this figure is arrived at is not known. During the year it is said that 2 146 births were registered, but in the absence of precise statements it is assumed the 128 stillbirths are included in this total.

Furthermore the *crude death rate* is given as 20.4 per 1 000 though by relating the 1 222 deaths (do these include stillbirths also?) to the population the death rate should be 18.0 per 1 000. [In previous issues of this *Supplement* attention has been called to inaccuracies of this kind but no steps appear to have been taken to present complete and reliable facts.]

The *Medical Staff* consists of a Chief Medical Officer (Dr J. M. CRUTCHMAN), a Medical Officer who is also the Government Bacteriologist, an Assistant Medical Officer, and five District Medical Officers.

Maternity and Child Welfare Work—Work at the ante-natal clinic established at the Out-patient Department of the Bahamas General Hospital continued throughout the year and a separate report of these activities is presented in the Report under review. During the year 146 women were seen and 263 attendances were recorded. The complete obstetrical history of each patient is recorded on an individual card. The Catholic Sisters continued to operate a similar clinic during the year 305 new patients and 660 attendances were recorded. In the report on *Infant Welfare Work* it is stated that 163 clinics were held, 1 010 new cases registered, and 10 788 attendances recorded. The *training of nurses and midwives* was continued as previously described (see this *Bulletin* 1938 Supp. p. 232*) there were 30 probationer nurses and 2 midwives in training during the year. Provision was made for the subsidizing of 12 qualified midwives in the Out Islands and all these appointments were filled during the year.

School Hygiene—It has not yet been found possible to begin the routine examination of school-children but it is hoped such a service will be inaugurated during 1939. The Assistant Medical Officer appends a report of his periodic sanitary inspections of the Boys' Industrial School. A card system has been introduced for the purpose of having the complete medical history of each boy maintained.

Public Health Sanitation etc—The Report observes The health of the Colony remained satisfactory throughout the year The *anti mosquito campaign* launched in 1937 was continued with satisfactory results. Two sanitary inspectors were detailed for this work and directed operations concerned with oiling draining bush clearance, etc. It is said that *Culex* and *Aedes* predominate with a few *Anopheles* in certain areas. An additional 51 buildings were connected to the city *sewerage system*. There are many areas not sewered and in such places efforts are being made to have privy pits replaced by septic tank installations. Services concerned with the *collection and disposal of refuse* continued to function satisfactorily. An increase of 129 houses connected to the chlorinated city *water supply* is reported. samples of water are analysed weekly and show that a high standard of purity is maintained. *Dairies foodshops etc* must comply with Health Department regulations (see this *Bulletin* 1939 Supp p 233 *) a new regulation was introduced requiring food and drink establishments to use an approved antiseptic solution for the sterilization of glasses etc. after use. The survey of *housing* conditions in slum areas was continued as a result a number of dilapidated and insanitary buildings were condemned and demolished.

A detailed report of the work of the Sanitation Department is contributed by the Chief Sanitary Inspector. During the year a part time Veterinary Surgeon was appointed to the Health Department. his work is described in the Report of the Chief Sanitary Inspector.

Port Health Work continued along lines previously described (see this *Bulletin* 1939 Supp p 233 *) during the year 695 vessels and 271 aeroplanes were granted pratique.

Hospitals Dispensaries etc—The volume of work dealt with at the various institutions may be summarized as follows —

Institution	Admitted	Treated	Died	Out patients
Bahamas General Hospital	2,872	2,944	315	25 122
Victoria Jubilee Infirmary	135	—	44	—
Lazaretto	2	18	2	—

It is by no means easy to follow the records of cases dealt with at treatment centres. For example in one case admissions to the

Alexandra Hospital are given as 3 197 in the Report of the Superintendent. Bahamas General Hospital admissions are given as 3 482 but in the Return of Diseases and Deaths relating to this hospital only 2,872 admissions are recorded. It would be of help to the reader to know which of these statements is the correct one. Attention has been called to similar contradictory statements in previous issues of this *Supplement*.

No candidates applied for the *First Aid Dressers Course* during the year the *training of nurses* has been referred to in the section *Maternity and Child Welfare* work above.

Fourteen cases of *typhoid fever* with 3 deaths and 1 case of *paratyphoid A* were treated at the Bahamas General Hospital. Analyses of the sources of the disease show that 90 per cent. of the cases occur in families using water from wells in their backyards. examination of well water continues and all found to contain contaminated supplies.

are condemned. The August 1938 number of the *Journal of the Royal Sanitary Institute* contains an article describing a 10-year anti-typhoid campaign in Nassau. *Dysentery* is not mentioned in the text of the Report, but the returns of the Bahamas General Hospital show that 63 cases of *amoebic dysentery* (81 admitted in 1938) were treated with 10 deaths and there were also 18 cases in which the type of infection was not defined.

Tuberculosis remains an important disease. Efforts are being made to isolate early cases, otherwise sufferers do not seek hospital treatment until the disease has reached an advanced stage. Hospital Returns supply the following data —

	Admitted	Treated	Died
Pulmonary tuberculosis	98	108	61
Other forms of tuberculosis	19	19	4

Other affections of the respiratory system were responsible for 98 in-patient cases with 17 deaths, and within this group the *pneumonias* accounted for 41 cases and 15 deaths.

Leprosy—Two admissions to the Lazaretto were recorded. The Medical Officer in charge of this institution contributes a separate report in which he discusses the year's work. Nasal smears were examined at the Bacteriological Laboratory.

Veneral Diseases—All the venereal diseases occur with the frequency previously described (see this *Bulletin* 1939 Supp. p. 234*). The hospital records show that for *sypilis* 290 patients were admitted, 295 were treated, and 31 died, and for *gonorrhoea and its complications* 40 were admitted, 44 were treated and one died. (Elsewhere it is stated that 95 patients were admitted for gonorrhoea.) In the Laboratory Report it is stated that Kahn tests were applied to all patients (private patients excepted) admitted to hospital. During the year 4,965 Kahn tests were performed and 31.4 per cent. of these reacted positively.

Other diseases mentioned in the Report included the following. One case of *malaria* was notified by a private practitioner. *Influenza* occurred as usual, co-incident with the arrival of visitors from the North, and 41 non-fatal cases were treated in hospital. *Pellagra* was responsible for 32 admissions to hospital (total treated 35) and one death. 57 patients were treated for *adrenic diseases* (see this *Bulletin* 1939 Supp. p. 234) and 53 for *appendicitis*.

Scientific.—The usual report of the work of the Bacteriological Laboratory is appended, a large part of the Report being devoted to discussing V.D. work. Further research on the blood sedimentation rate of normal coloured individuals and on cases of pellagra was continued. It is observed that the results of autopsies on native Bahamians reveal a striking absence of some pathological conditions found among patients of many other countries. For example, in over 500 autopsies, *gall-stones* were found on two occasions only while *gastric or duodenal ulcer* and *carcinoma of the intestinal tract* were not met with in a single case. The conclusion reached is that as extreme constipation is a very frequent local complaint, it cannot be a very important factor in the inception of carcinoma in these people.

Financial—Expenditure on Medical and Sanitary Services in 1938 amounted to £34 879 a sum which represents 8.3 per cent. of the total revenue of the Colony

BARBADOS (1938-39)

Barbados, the most easterly of the West India Islands, is situated in latitude 13°4'N and longitude 59°37'W. Its length is 21 miles, its breadth 14 and it has an area about 168 sq miles, a little larger than is, than the Isle of Wight.

General—Dr J. D. ALLEYNE continued in charge as Acting Chief Medical Officer until Dr B. N. V. WASE BAILEY assumes duty as Chief Medical Officer.

Vital Statistics—For the year ending 31st December 1938 the population was estimated to number 193,092. Registered births numbered 5,327 and deaths 3,739 the resulting crude annual birth and death rates being 27.6 and 19.4 per 1,000. Infant deaths numbered 1,182 giving an infant mortality rate of 222 per 1,000 births. Mortality data continued to be presented in the tabulations previously described (see this *Bulletin* 1939 Supp. p. 235*).

The Medical Staff comprises a Chief Medical Officer (see *General* above) and 10 Medical Officers. (These include 2 Medical Superintendents of Hospitals and Specialist Officers.) In addition on the Staff of the Medical Department part-time Visiting Officers include 3 Surgeons, 5 Assistant Surgeons, a Radiologist, a Dental Surgeon and 2 V.D. Medical Officers and on the Staff of the Leper Hospital one Visiting Physician.

Maternity and Child Welfare Work—Plans for the conversion of Stockton House into a Maternity Ward are under consideration. The Infant Welfare Clinic conducted by the Baby Welfare League continued to function and with the assistance of additional financial aid from Government was able to extend its activities. During the year 308 new babies were admitted to the Clinic and attendances totalled 4,105. Government also contributes to the Children's Goodwill League Crèche the 26 children accommodated daily receive free meals and medical attention.

As facilities for the training of midwives are not available at the General Hospital or St. Michael's Almshouse (the latter institution being the training centre in past years) the General Nursing Council have prepared and placed before Government a scheme for the training of midwives and nurses etc. Meanwhile there are registered in the Island 264 women as midwives only, 72 as nurses only and 117 as both midwives and nurses. Diseases of pregnancy etc. caused the deaths of 30 women during the year under review.

School Hygiene—The Report states that the medical inspection of school-children was continued and that a marked improvement is noted in the health of children attending elementary schools following the free distribution of milk and biscuits. No details of medical examinations are supplied. A scheme providing for school dental services has been prepared and is about to be introduced. The sanitary condition of the two Government Industrial Schools and the general health of the children attending these Institutions, are reported to have been good.

Public Health Sanitation, etc.—No changes of importance in the sanitary organization of the Island are reported, but it is said that a scheme for the centralization of all sanitary services has been prepared and submitted to Government (see this *Bulletin* 1933 Supp. p. 214* and subsequent issues). The six Board of Health Inspectors worked steadily throughout the year a most successful "Health Week" was held during the last week of October.

Port Health Work—The Annual Report of the Port Health Officer which is presented as an Appendix to the Report under review described in detail the year's activities. Quarantine measures were enforced throughout the year against arrivals from certain territories in the Caribbean Sea and South America. It is said that 1134 vessels entered the port at Bridgetown 300 of them from ports infected or suspected of being infected with quarantinable diseases. During the year 5021 passengers and 23,560 members of crews were medically inspected. 74 persons, mainly passengers and practically all from Venezuela were placed under surveillance. The trapping and poisoning of rats was continued. 2,830 rats were destroyed and 298 carcasses examined by the Government Bacteriologist but no plague bacilli were found.

Hospitals, etc.—No change is recorded in the public provision for the care and maintenance of the sick in the Colony (see this *Bulletin* 1935 Supp. pp. 212*-213*). No details are supplied of the number of cases treated at the Barbados General Hospital which has accommodation for 275 patients. A *Nurses Home* was opened at the end of May 1933.

At the *Mental Hospital* there were 633 patients in residence at the end of March 1939. No details of admissions, discharges, etc. are supplied.

To the *Leper Hospital* there were 5 new cases admitted 4 re-admissions, 2 discharges and 12 deaths. At the end of the year there remained 63 inmates.

The medical work of the *Parochial Almshouses* (eleven maintained) was satisfactorily carried out during the year.

The references to the year's morbidity experiences are fragmentary and confined to mention of the cases notified of a few selected diseases, among which occur the following:—

Of *enteric fever* 184 cases were notified and 42 deaths were recorded during the year. The Sanitation Officer and Inspectors of the General Board of Health continued to trace contacts and likely sources of infection. Prophylactic treatment, both oral and by inoculation was carried out. No statement of the number of notified cases of *dysentery* is supplied, but it is said that 12.3 per cent. of all registered deaths were due to *dysentery*, *diarrhoea* and *enteritis*. These causes were responsible for 459 deaths in the Island, dysentery alone accounting for 35 deaths. 378 of the diarrhoea and enteritis deaths occurred among children under 5 years of age.

Notified cases of *tuberculosis* numbered 98 but deaths due to all forms of the disease numbered 184 and of these 143 were ascribed to the *pulmonary* form of the disease. Among other *respiratory affections* it is noted that *pneumonia* caused the deaths of 238 and *bronchitis* of 61 persons.

Thirty-three cases of *diphtheria* were notified but no deaths were registered as due to this cause.

BERMUDA—BRITISH GUIANA (1938)

No fresh cases of *malaria* have been recorded for nine years but Board of Health Inspectors continue a careful search for anopheline mosquitoes.

The *Venerical Diseases Clinic* of the General Hospital recorded 1 165 new cases, and 18 416 attendances for treatment. A V.D. Clinic has been established in the Parish of Christ Church so there is now a branch clinic in each of the outlying parishes. Cases dealt with read as follows —

Item	New Cases	Old Cases	Gross Attendances
Syphilis	1,259	1,278	16,248
Gonorrhoea	856	428	13,897
Other V.D.	53	29	392

In addition to the diseases mentioned above other important causes of mortality during 1938 included diseases of early infancy responsible for 378 deaths, *nephritis* for 265 deaths, cancer for 173 deaths, *pellagra* 67 deaths and *influenza* 46 deaths.

Scientific—It is said that Government maintains a well-equipped Bacteriological Laboratory but no details of the work carried out at this institution are supplied in the Report under review a separate Report describing laboratory services is issued.

Financial—The only references under this heading state that expenditure in connexion with the *Mental Hospital* amounted to £14 711 the *Leper Hospital* £3 107 that *Parochial Expenditure on Sanitation* totalled £15,942, and *Parochial Poor Law Administration* services cost £43 676

BERMUDA (1938)

The Bermudas or Somers Islands form a cluster of some 300 small islands in the Western Atlantic in latitude 32°15'N and longitude 64°51'W. The nearest mainland is Cape Hatteras in North Carolina, 880 miles distant. Most of the islands are mere rocks and less than a score are inhabited. The total area is estimated at 19 square miles.

The Annual Medical Report for 1938 had not been received at the time of going to press on February 26th 1941

BRITISH GUIANA (1938)

British Guiana, the only British Colony on the mainland of the South American Continent, lies on the north-eastern coast. Its seaboard of about 270 miles extends almost from the eastern mouth of the River Orinoco to the River Courantyne and has to the north the Atlantic Ocean to the south and south west Brazil to the east Dutch Guiana and to the north west Venezuela. Its area is approximately 89 480 square miles (a little more than England, Scotland and Wales together). Its capital is Georgetown, the next most important town being New Amsterdam, about 60 miles east of Georgetown.

Vital Statistics—A very comprehensive account of population movements in the Colony is presented. Limits of space permit nothing

more than the presentation of the relevant facts (see this *Bulletin* 1936 Supp. p. 240*) which read as follows —

Item	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I M.R.
The Colony	537,521	10,018	29.7	8,704	25.8	1,661	166
Georgetown	87,534	1,948	28.8	1,412	20.9	232	119
New Amsterdam	9,085	305	31.0	283	27.4	47	154

The average population of the *Maroon Diamond Fields* was 4,082; no births were registered, but deaths numbered 37. No population figures are given for the *Sugar Estates* where 2,055 births and 1,635 deaths were registered and an infant mortality rate of 140.1 was recorded.

The *Medical Staff* authorized for 1936 comprised a Director of Medical Services (Dr. N. M. MacLENNAN), 36 Medical Officers of various grades (including Specialists, etc.) and 2 temporary Assistant Medical Officers.

Maternity and Child Welfare Work continued to operate under the control of the Infant Welfare and Maternity League (see previous issues of this *Supplement*) with a staff of two Inspectors of Midwives, eight Health Visitors, and 38 subsidized Midwives. Clinics were also conducted by Government Medical Officers within their districts, and by Government Dispensers in the more remote areas. Maternity and child welfare work continued to make progress on the Sugar Plantations. Maternity returns for the Public Hospitals read as follows —

Hospital	Deliveries	Maternal Deaths	Births	Stillbirths
Georgetown	973	30	863	91
Bartica	206	18	209	36
Sedho	111	9	111	20
Mararuma	34	—	33	1
Bartica	26	1	21	2

During the year 28 out of 39 pupil midwives under training at Government Hospitals were successful at their midwifery examinations.

School Hygiene — No regular school medical inspection is undertaken. The results of medical examination of 167 boys at Queen's College showed the following defects — *dental caries* 49 per cent. *diseased tonsils* 48 per cent. *defective vision* 15 per cent. During the year school dental work was carried out as usual. In Georgetown the School Dental Surgeon held clinics every school day throughout the year. The usual short report on health conditions at the Onderneeming Industrial School is presented (see this *Bulletin* 1936 Supp. p. 241*).

Public Health Sanitation, etc. — No changes in the administrative aspects of public health work are reported. The Report describes the public health responsibilities of the Central Board of Health, the Urban Sanitary Districts and the village and country districts, concluding with the observation: "It is therefore patent, that some revision of the present organization is required." *Anti-malarial work*

continued to receive the attention of the authorities (see this *Bulletin* 1939 Supp p 241*) Georgetown is the only place in the Colony with a water borne *sewage disposal* system. Elsewhere methods remain as described in previous issues of this *Supplement*. With the exception of a single water treatment plant at Plantation Albion and 69 artesian water sources, there are no safe *water supplies* on the coastal belt of the Colony. Georgetown and New Amsterdam have piped supplies but the view is expressed that these supplies cannot be considered safe for domestic consumption (see this *Bulletin* 1937 Supp p 231*). A summary of the work carried out by the *Standing Committee on Nutrition* is presented and includes references to the results of examination of school-children milk and dietary investigations etc. and adds: An extraordinary absence of precise observations on the prevalence of deficiency diseases precludes any authoritative statement as to the state of nutrition in this Colony. (See also *Scientific* below) *Housing* conditions in various areas and on the Sugar Estates are discussed at some length (see this *Bulletin* 1939 Supp p 242*).

Port Health Work—Quarantine was permanently maintained during the year against all South and Central American ports (except British French and Dutch) for yellow fever plague, smallpox, cholera and typhus fever against New Orleans Mobile and Tampa (U.S.A.) for typhus fever and against ships arriving from certain ports in the Caribbean Sea. During the year 141 vessels were visited by the Port Health Officer and 220 steamers and 483 sailing vessels were also visited by the Port Sanitary Inspector. Rat destruction activities were continued: no plague-infected rat was discovered among those subjected to post mortem examination.

Hospitals Dispensaries etc—Upwards of forty pages of the Report are devoted to descriptions of the Public Hospitals Dispensaries and other institutions and treatment centres maintained by Government treatment facilities provided on Sugar Estates and by Mining Companies are also described (see this *Bulletin* 1939 Supp., p 242*). The volume of work dealt with at Government Institutions may be summarized as follows:—

Institution	Admissions	Treated	Deaths	Out patients
<i>Hospitals —</i>				
Georgetown	14 525	15 079	1 331	33 167
New Amsterdam	3,394	3,538	963	13,334
Saddie	2,368	2 437	219	7 768
Bartica	702	723	53	3,372
Mabaruma	535	558	36	1,823
Kamakoma	58	58	2	1,379
Potaro	27	27	—	479
Mental	99	806	150	—
<i>Other Institutions —</i>				
Prisons	113	—	1	—
Almshouse	699	1 564	313	—

No change is recorded in the numbers and distribution of *Public Dispensaries* (see this *Bulletin* 1939 Supp p 243*) during the year upwards of 34 000 new cases were treated. The arrangements for

dealing with sick persons in the *Hinterland Settlements* remain as previously described in the pages of this Supplement.

The training of nurses was continued at the Government Hospitals at Georgetown, New Amsterdam and Suddie. 19 nurses entered for the First Professional Examination and 18 passed, and a further 19 sat for the Final Examination and 18 were successful.

Twenty-two out of thirty-one plantations on *Sugar Estates* provide and maintain hospitals and dispensaries for their employees. 30,363 patients were admitted to these hospitals, there were 1,056 deaths and 10,157 out-patients were dealt with. Hospitals and dispensaries are also maintained in the various *Miner Companies*.

Unusually comprehensive commentaries in the Report under review describe the principal items of morbidity experience in the Colony during 1933. Only the briefest references can be made in these pages to these matters.

Malaria is responsible for more than 10 per cent. of all patients admitted to Public Hospitals. Of 2,488 cases diagnosed in hospitals 2,458 were cases of malaria (with 148 deaths) and 10 were cases of blackwater fever (with 4 deaths). Among the in-patient cases 216 were benign tertian, 3 quartan, 129 subtertian, 329 chronic malaria and 1,781 were unclassified. In the Colony as a whole 999 deaths were ascribed to malaria, 346 to *undefined fevers* and 9 to blackwater fever. On *Sugar Estates* 14,600 cases of malaria were treated in hospitals with 178 deaths (see also *Scientific* below). malaria is also the prevailing disease in the *Mining* areas.

At the Government Laboratory where 2,114 blood films were examined 331 contained benign tertian parasites, 134 subtertian, 2 quartan and 7 were mixed infections.

Filaria (and filarial druse) was responsible for 336 hospital in-patient cases with 14 deaths while 52 deaths were ascribed to this cause in the Colony as a whole. Thirty-one in-patient cases and 49 out-patient cases of elephantiasis were treated.

Influenza is not a notifiable disease and therefore accurate information regarding incidence is not available. An epidemic outbreak of the disease was reported in August and appears to have spread rapidly to the interior amongst the aboriginal Indians. It is believed the epidemic gave rise to about 7,000 cases.

Following reports of a disease suspected to be a jungle variant of yellow fever a medical mission visited the Rupununi District in March and special precautionary and investigative measures were undertaken. A short report of the work of the mission is contained in the Report under review.

Fever of the *enterica* group were responsible for 512 reported cases and 115 deaths. It is estimated that for every four cases of these diseases only one was notified. Cases treated in hospitals as in-patients numbered 155 with 39 deaths, their distribution being typhoid 139 cases, one case each of paratyphoids A, B and C, and 15 cases in which the type of infection was not defined. At the Laboratory where 351 samples were serologically tested 104 agglutinated positively with *Bact. typhorum*, 3 *Bact. paratyphorum A*, 5 with *B*, 4 with *C* and 8 were mixed infections. In addition 591 faecal samples were cultured and *Bact. typhorum* isolated in 50 cases.

Among the 184 in-patient cases of dysentery treated (with 27 deaths) 34 were amoebic infections, 3 were bacillary and 157 were undefined. Dysentery caused the deaths of 185 persons in the Colony during the

year. At the laboratory 1,336 faecal specimens were examined. *E. histolytica* was present either free encysted or in association with other parasites in 29 cases while *Bact. dysenteriae* (Flexner) was isolated in two of 594 faecal samples cultured. *Diarrhoea and enteritis* was responsible for the deaths of 563 persons in the Colony. 490 in patients were treated for this cause and 114 hospital deaths were recorded.

Among the notifiable diseases *tuberculosis* accounts for the greatest number of deaths. During the year 277 deaths were ascribed to this cause in the Colony. Notified cases during 1938 numbered 318. Hospital in-patient cases of all forms of the disease numbered 483 with 163 deaths and of these 462 cases and 161 deaths were due to the pulmonary form of the disease. At the Laboratory *Mycob. tuberculosis* was present in 129 samples of sputum out of 1,248 specimens examined. Other respiratory diseases treated in Public Hospitals included 766 cases of bronchitis (65 deaths), 265 cases of pneumonia (135 deaths), 133 cases of broncho-pneumonia (70 deaths) and 442 cases of asthma with 50 deaths.

For *ankylostomiasis* 115 in patients and 198 out patients were treated. At the Laboratory where 1,398 faecal specimens were examined *Ancylostome* ova were present in 236. *Ascaris* in 22, *Trichuris* in 6. The absence of *S. mansoni* is noteworthy for this is the common parasite in the adjoining colony of Surinam.

Leprosy—Liberal extracts are quoted from the annual report of the Leper Hospital (see this *Bulletin* 1939 Supp. p. 245*). At the end of the year there were 871 cases of leprosy known to the authorities and of these 417 were inmates of the Leper Hospital and 454 were being treated as out patients. During 1938 there were 65 admissions to the Hospital, 83 were discharged and 21 deaths were recorded.

Veneral Diseases—Clinics continued to function as previously described (see this *Bulletin* 1939 Supp. p. 245*) and details of the work are again presented in an admirable series of tabular statements. The volume of work dealt with may be summarized as follows—

Disease	Government Treatment Centres		Sugar Estates	
	In-patients	Out-patients (new cases)	In-patients	Out patients (new cases)
Syphilis	539	886	47	149
Gonococcal Infections	678	1,020	53	92
Granuloma Venereum	106	41	—	5
Soft Chancre	45	30	4	3

Only 17 in patient and 30 out patient cases of *yaws* are recorded.

Other Diseases referred to in the Report under review include the following. *Nephritis* was responsible for 673 deaths in the Colony and accounted for 448 cases treated as in patients in Public Hospitals with 143 deaths.

Affections of the organs of vision are discussed at length in the Report of the Ophthalmic Department. During the year 5,675 patients were treated, 415 as in patients.

Scientific—The Annual Report of the Government Central Laboratories observes that during the year 18,049 specimens of various kinds were examined and of these 9,840 were in connexion with venereal

disease. Brief reference has already been made in the preceding notes to the number and nature of other specimens received and findings recorded.

The Government Bacteriologist contributes a report on *Nutritional Anaemia in British Guiana* based upon the investigation of seventy cases—this investigation continues.

A comprehensive survey of the available scientific data regarding the anopheline mosquitoes of the Colony is contributed by Dr. G. GIGLIOLI, Medical Adviser to the Sugar Estates of the Colony (see this *Bulletin* 1933 Supp. p. 246*). This really admirable paper (abstracts from which appeared in the *Tropical Diseases Bulletin* 1940 Vol. 37 p. 356) discusses (a) The Anopheline Mosquitoes of the Colony (b) which of the local species are responsible for the transmission of malaria (c) breeding habits of *A. darlingi* and natural factors which limit the distribution of this species and of malaria, and (d) the distribution of malaria on the coastlands and the genesis of malaria epidemics.

Financial—Medical Department expenditure (including Public Health Department) during 1933 amounted to £621 778, a sum which represents 8.3 per cent. of the revenue of the Colony for the same year.

BRITISH HONDURAS (1933)

British Honduras is on the east coast of Central America, with Yucatan (Mexico) on the north and north-west and Guatemala on the west and south and on the east the Bay of Honduras (Caribbean Sea). It has an area of about 8,500 sq. miles, i.e. about the size of Wales.

Vital Statistics—The population at the end of the year was estimated to number 57 787—the birth rate for the year under review was 35.3 per 1,000 but the death rate is not recorded. The infant mortality rate was 125.2 per 1,000 live births. The following data have been extracted from District Medical Officers' Reports—

District	Estimated Population	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Belmopan	No details supplied						
Corozal	8 190	No details supplied					
El Cuyo	7 337	200	25.1	109	14.8	24	—
Orange Walk	6 573	167	25.4	107	16.3	—	140.7
Stann Creek	6 425	187	29.1	111	17.3	25	144.3
Toledo	6,430	234	45.7	225	45.9	68	231.2

* This rate as published indicates 173 live births. The 187 births noted probably include stillbirths.

The Medical Staff consists of a Senior Medical Officer (Dr. R. L. CREVERTON) and eight Medical Officers.

Maternity and Child Welfare Work—The principal references to this important branch of Public Health Work are contained in the Reports of District Medical Officers (see this *Bulletin* 1933 Supp. p. 247*). Maternity work is mentioned by two District Medical Officers only. The Medical Officer, Orange Walk, reports no trained midwife in the

district and no accommodation in the Hospital for maternity cases while the Medical Officer Toledo District states that with two exceptions all other midwives are unqualified their methods are primitive, and that in some Indian villages midwifery is carried out not by women but by men *Infant Welfare Clinics* appear to function with success in all districts.

School Hygiene—The new card system adopted by Medical Officers throughout the Colony for recording results of examinations of school children is said to have proved a great success. Details of the work carried out in each District are presented in the individual District Reports but though the card system is uniform throughout the Colony it is noted that methods of presentation of results differ widely between district and district. In the Stann Creek District Report the references to school medical work appear under the title *Summary and Conclusion* in the section devoted to describing the work of the Hospital. In an Appendix, Dr C. W. WELLS of the Rockefeller Foundation contributes a detailed account of his visit to the Colony for the purpose of carrying out a Tuberculosis Survey. During this visit 4,234 school-children were tuberculin tested, and 77.7 per cent. proved tuberculin positive the results which are tabulated for each school visited show considerable variation ranging from 51.7 per cent to 89 per cent the latter in the Salvation Army School in Belize. The Report discusses what steps might be taken for the control and prevention of tuberculosis in Belize recommendations for measures to be taken outside Belize were purposely omitted since the economic resources of the Colony are not adequate to support such an extensive programme.

Public Health Sanitation etc—Dr R. L. Cheverton Senior Medical Officer reports that the health of the Colony was satisfactory notwithstanding a decline in the economic condition of the people during the latter half of the year. The organization of health services remained as previously described (see this *Bulletin* 1935 Supp p 227*) but under the provisions of a Bill entitled *An Ordinance to amend the Public Health Ordinance* powers and duties with respect to health and sanitation throughout the Colony will be transferred from certain authorities to the Senior Medical Officer with effect from 1st January 1939. Closer attention was devoted to *anti-malarial* measures. Under the reclamation scheme it is proposed that an area of at least half a mile around the town of Belize should be left as an open space and that pastures should be established for cattle thus providing anophelines with a blood food (see also this *Bulletin* 1939 Supp p 249*). So far no active *anti-amaryl* measures with regard to aerial traffic from Central American countries have been adopted with the establishment of a permanent air-field the question will be reviewed. *Sanitation* and the control of sanitation leave much to be desired and schemes for a more energetic programme with complete control are being prepared for all practical purposes services concerned with *sewage and refuse disposal and water supplies* remain as described in previous issues of this *Supplement*.

During the year a *housing survey* was carried out in Belize. The results of this survey are set out in detail in the Report under review but for purposes of this summary it must suffice to say that of 764 houses visited, 55.5 per cent. were overcrowded 28 per cent. were without latrines and 24 per cent. lacked adequate water supplies. In connexion with slum clearance schemes it is stated that steps are

being taken for the reclamation of bush areas around various towns to provide open spaces and sites for the erection of houses.

The *Reports of District Medical Officers* are presented as Appendices to the Report under review and provide detailed accounts of medical and sanitary activities in the respective districts. In another Appendix, the *Senior Sanitary Inspector Belize* contributes a detailed account of the year's work of his department (see also this *Bulletin* 1935 Supp., p. 248*).

Port Health Work—Quarantine regulations were again in force against Central American Republics. The development of air services connecting the Colony with Mexico Spanish Honduras and other neighbouring countries will increase quarantine problems in the near future especially with regard to yellow fever (see above *Public Health* etc.)

Hospitals Dispensaries etc—No change is recorded in the numbers and accommodation of hospitals in the Colony. The Belize Hospital is totally inadequate for the demands made plans for a new hospital have been submitted to the Secretary of State. Extensive repairs and alterations were carried out at the El Cayo hospital during the year. A detailed classification of the various diseases treated in Colony hospitals is presented in Part 2 of the Report under review. At all hospitals (total beds 133) 2,699 patients were treated and 176 died there were 19 101 out patients. (See also below)

Work at the *Eye Clinic* was temporarily suspended, but on the resumption of activities 312 patients received treatment. The *Dental Clinic* functions twice weekly during the year 1,306 persons were treated.

The training of nurses is carried out at the Belize Hospital. It is observed that probationary staff nurses are insufficient to meet the needs of the hospital.

There are two branch dispensaries in the Colony. The dispensary at Benque Viejo is visited weekly by the District Medical Officer of El Cayo but it is also open daily for the treatment of minor ailments under the supervision of a Roman Catholic Sister. The second dispensary takes the form of a mobile unit which visits agricultural settlements and P.W.D. Camps between Belize and the village of Maskall. This work which was started in June 1933 is in the nature of an experiment. No details of the work carried out at dispensaries are available.

It is stated "there has been a considerable increase of admissions to the various institutions owing to a continued confidence shown by the people and a re-awakening of the Department to its multitudinous responsibilities." In connexion with numerical statements of the year's work of the various hospitals. It is necessary to add that it is by no means easy at times to understand why recorded facts should be at variance in different parts of the Report. For example on page 13 it is stated that 1,852 cases were admitted to the Belize Hospital, and that the Out patient Department dealt with 30 035 cases. In Part 2 of the Report only 1,746 admissions to this hospital are recorded, and only 7,534 new cases among out-patients are mentioned. Conflicting numerical statements are also encountered when specific diseases are under discussion. The notes which follow summarize references in the Report to the principal diseases which received the attention of the Department during the year.

Malaria persists as a serious economic problem. The policy instituted during the year of free distribution to school children and

labourers of quinine has met with encouraging results and in a country so inundated with water the wider distribution of this drug would appear to provide a first line of attack. According to the classified returns it would appear that 305 in patients were treated (stated as 273 in another section) for the disease at the Belize Hospital with 8 deaths and at the five District Hospitals 374 cases with 37 deaths. Of the 305 cases treated at the Belize Hospital the type of infection was determined in 32 cases only, and at District Hospitals in 161 cases out of the total 374 cases treated. There were 18½ out patient cases at the Belize Hospital and 2 919 at the District Hospitals. In the Colony as a whole 75 deaths were ascribed to malaria. Twelve cases of *blackwater fever* were reported 9 of them from Stann Creek with one death.

Yellow fever —Viscerotomes have been issued to each district and arrangements made with the Findlay Institute Cuba, for the examination of pathological specimens those submitted so far have proved negative. The Department is alive to the possibility of bush yellow fever.

During the year 88 cases of *alastrim* were reported. Outbreaks in the Cayo and Corozal Districts were ascribed to imported infections. As a result of the examination of school-children it was found that over 32 per cent. were unvaccinated. 3,546 children under 5 years of age were successfully vaccinated during 1938.

Three cases of *diphtheria* with one death were recorded and mention is made of outbreaks of *mumps* and *whooping cough*.

No case of *enteric fever* was reported but cases of *dysentery* occurred in all districts. Classified returns supply the following details of cases treated —

	Belize Hospital			District Hospitals		
	In patients	Deaths	Out patients	In-patients	Deaths	Out patients
Amoebic	19	1	20	53	5	76
Bacillary	1	—	—	4	1	7
Unclassified	13	4	29	4	1	21

The Report states that 51 cases of *tuberculosis* (all forms) were treated at the various hospitals during the year but the classified returns supply the following figures —

	Belize Hospital			District Hospitals		
	In patients	Deaths	Out patients	In-patients	Deaths	Out patients
Pulmonary Tuberculosis	12	2	5	13	1	37
Other forms	15	3	9	3	1	4

Certified deaths ascribed to the disease in the Colony as a whole numbered 28. Attached to the Poor House are 12 single-bedded huts for the accommodation of incurable cases of tuberculosis there were

never more than three cases isolated in these hutments during the year. Reference has already been made to the survey carried out by Dr C W WELLS (see above *School Hygiene*). During the course of this survey 172 adults were tuberculin-tested and 97 per cent. were tuberculin positive.

Bronchitis and *pneumonia* are said to have been very prevalent during the latter half of the year under review. In the text of the Report it is observed of the pneumonias that 255 cases were admitted to the various hospitals, but this statement does not accord with the data recorded in the hospital returns viz —

	Pneumonias			Bronchitis		
	In-patients	Deaths	Out-patients	In-patients	Deaths	Out-patients
Belize Hospital	80	17	8	27	1	536
District Hospitals	40	11	175	15	1	290

The high incidence of *helminthic disease* is a subject of comment by all District Medical Officers. worm infestations are a source of chronic ill-health amongst most of the children in the Colony. The Medical Officer Corozal, carried out a survey of the children of 11 schools in his district, examined 499 faecal specimens and found the most common varieties of worms to be *ankylostoma*, *ascaris* and *trichuris*. Hospital returns show that 1,335 in- and out-patient cases of *ankylostomiasis* and 344 of *ascariasis* were treated during the year. Owing to lack of funds no concerted effort can be made to combat *ankylostomiasis* and allied conditions, but Medical Officers dispense *chenopodium* to the villagers.

Veneral diseases are very prevalent and the incidence of *syphilis* said to be "very high." A special clinic for treating syphilis was opened in Belize during the year and it is said that 1 456 cases were treated. In another section of the Report (p. 14) cases of syphilis treated at the Belize Hospital appear to have numbered 219 while in the classified Hospital Returns in- and out-patients treated for the disease at this hospital are given as 208. *Gonorrhoea* and other venereal diseases are common and are commented upon in the Reports of all District Medical Officers (see this *Bulletin* 1930 Supp. p. 250*). The classified returns provide the following records of in- and out-patients treated at the various hospitals during the year —

	Belize Hospital Cases	District Hospitals Cases
Syphilis	208	200
Gonorrhoeal Affections	127	364
Buboes and Chancres	64	47
Other V D	7	61

Other diseases referred to in the Report under review and calling for brief mention include the following

A number of patients were treated for conditions due to *malnutrition* chiefly associated with deficiencies of Vitamin B₁₂, but other forms of

avitaminosis were also seen. In connexion with these conditions conflicting statements are evident. On pp 4-5 of the Report it is stated that 27 cases of *diabetes*, 28 of *scurvy*, 28 of *pellagra* and 77 of *rickets* were treated, but the classified hospital returns for in- and out-patients record diabetes 29 cases, scurvy 27, pellagra 16 and rickets 80 (see this *Bulletin* 1939 Supp p 250*). There is a wide range of *skin diseases* in the Colony and during the year upwards of 1 600 in- and out-patients were treated for various skin affections. Of these 542 were cases of unqualified *ulcers*. Among the sores *leishmaniasis* of the ear is fairly common. The Report observes that 221 cases of *leishmaniasis* were reported, but only 90 cases appear in the hospital returns. The Report also states that 59 cases of *cancer* were notified. At the Belize Hospital 36 in- and out-patients were treated with 5 deaths, and at the District Hospitals there were 15 cases with one death. In March an outbreak of *rabies* occurred in Belize and two fatal cases of the disease were recorded. The usual methods were taken to control the spread of the outbreak. Three non-fatal cases of *relapsing fever* were treated at the Belize Hospital. At all hospitals 1 082 cases of *influenza* were treated.

Scientific—At the Hospital Laboratory, Belize upwards of 3 000 specimens of various kinds were received and examined. Serological examinations included 1,227 Kahn tests, 542 of which gave positive reactions. Through the courtesy of the Rockefeller Foundation the Laboratory Technician was given a Travel Grant and enabled to visit the Laboratory at Managua, Nicaragua. The Special Reports which appear as Appendices in the Report under review have been the subject of brief reference in the preceding notes.

Financial—Total expenditure on Medical Department services during 1938 amounted to \$97 669.

JAMAICA (1938)

Jamaica, an island in the Caribbean Sea, about 80 miles south of Cuba within 17°42' and 18°32'N latitude and 76°11' and 70°23'W longitude. It is the largest of the British West Indian Islands, being 144 miles long and 50 at its greatest breadth and having an area of 4 450 sq miles or about half that of Wales. Kingston, the capital, is on the south coast in the County of Surrey. The Cayman Islands and the Turks and Caicos Islands are dependencies of Jamaica.

Vital Statistics—The estimated population at the end of the year was 1 173 645. Registered births numbered 37 970 and deaths 19 124, the resulting crude birth and death rates being 32.4 and 16.3 per 1 000 respectively. The *infant mortality rate* is given as 129 per 1 000 live births.

The Medical Staff during 1938 appears to have comprised a Director of Medical Services (Dr T. J. HALLINAN), 2 Assistant Directors of Medical Services, 2 Senior Medical Officers, 81 Medical Officers (including Specialists), 6 Assistant Medical Officers and 14 Temporary Medical Officers.

Maternity and Child Welfare Work—There is little to add to previous descriptions (see this *Bulletin* 1933 Supp pp 244*-245* and 1939 Supp pp 251*-252*). The medical department is aiming at the development of special services for expectant mothers and young children, but at present such services are in the main provided only

in the Corporate Area of Kingston and St. Andrew. At the Jubilee Lying-in Hospital admissions numbered 3,082, live births 2,515, maternal deaths 27 and infant deaths 77. To the Kingston Clinic 1,524 expectant mothers paid 3,209 visits to the ante-natal sessions and there were 21,085 attendances of children under 5 years of age. The *Child Welfare Association* continued its activities and has also established a number of branches outside Kingston. A nucleus of a Public Health nursing service has been established during the past two years and so far nine parishes have one nurse each.

School Hygiene—The School Medical Officer of the Corporate Area contributes a Special Report of the year's work. The medical inspection of elementary schools in the Corporate Area was completed and a summary of the work and results recorded is presented. Briefly there were 22,500 children on the registers of 69 schools. All schools with two or three exceptions are overcrowded, water supplies were not always adequate. Eye and skin diseases, dental caries, and malnutrition were among the principal defects noted. The nutritional state of the children was found to fluctuate greatly with season, apparently depending upon fruit crops. Outside the Corporate Area the inspection of school-children was undertaken on a limited scale. Altogether 8,398 children were examined and 25 per cent. found to be in poor nutritional condition, 25 per cent. with dental defects. It is said that probably 70 per cent. of the children in rural areas harbour worms.

School Dental Clinics are maintained in 12 parishes.

Public Health Sanitation, etc.—A number of new appointments to the Medical and Subordinate Staff of the Medical Department are listed. *Malaria* control work was well maintained throughout the year. Excellent progress is reported in connection with the development and improvement of the *sewerage system* of Kingston and with sewerage schemes in other areas. During the year 11,842 new latrines were completed and 16,501 repaired. The quantity and quality of the water supplies of the larger towns have been greatly improved and special mention is made of the developing use of deep wells for domestic supplies as well as for agriculture. In the Corporate Area the Water Commission completed installation of a modern purification plant and new works were also completed in several other areas. *Inspection of food supplies* and supervision of dairies continued to be carried out as usual. Under the auspices of the *Nutrition Committee* the Medical Department carried out economic surveys in all parishes with a view to assembling reliable information relating to the dietaries and food purchasing power of the working classes. Important activities of the Agricultural Department and the Jamaica Agricultural Society have an important bearing on some of the problems of nutrition, while the Education Department is devoting special attention to the development of school and kitchen gardens, etc.

Port Health Work—The greatest vigilance continues to be exercised to guard against the introduction of yellow fever and other dangerous infectious diseases from neighbouring countries. No cases of a quarantinable nature arrived on vessels during the year. The preparation of the ground on the Palisadoes for an *airplane base* is well advanced. Arrivals recorded during the year included 1,406 ships at Port Royal, 116 vessels at outports and 371 seaplanes.

Hospitals, Dispensaries, etc.—Building improvements have been mostly in the direction of providing increased facilities for maternity

work and for the treatment of pulmonary tuberculosis maternity wards are now provided at ten District Hospitals and four new tuberculosis wards were also completed at District Hospitals during the year. A new scheme for the development of hospital facilities has been approved by Government (see also this *Bulletin* 1939 Supp. p. 253*). *Special Hospital Reports* contained in the Report under review describe the year's work at (a) Kingston Public Hospital, (b) The Jubilee Lying in Hospital, (c) The Mental Hospital, (d) The Lepers Home.

At all institutions 38 560 in-patients were treated, 2 499 hospital deaths were recorded and upwards of 330 000 out-patients were dealt with.

Six new *Dispensaries* were opened during the year bringing the total of such treatment centres up to 76. Attendances of outdoor patients totalled 254,507.

It is assumed that the *training of nurses* continues at the Kingston Public Hospital. For the Report observes that 44 Nurses passed their final examination.

During 1938 notifications of infectious diseases numbered 2,745 and of these 1,376 were for pulmonary tuberculosis and 578 for typhoid fever.

Malaria was responsible for 529 deaths in Jamaica during 1938 but in addition 1 886 deaths were registered as due to *Fever not otherwise defined* (only 45 per cent. of the deaths in the Island are medically certified). At the Kingston Public Hospital 523 in-patients were treated for malaria and 19 died and at the 19 District Hospitals malaria in patients numbered 2,339 (95 deaths) and out-patients 8 197. Only for the District Hospitals are types of infection differentiated and these read (in patients and out-patients together) *benign tertian* 9 022, *quartan* 638, *subtertian* 117, *cachexia* 84, *blackwater fever* 21 and undefined 4. At the Laboratory 5,224 blood films were examined and positive findings recorded in 978 cases of the positives 92 per cent were subtertian, 7.9 per cent benign tertian and 0.1 per cent quartan.

A marked reduction in the incidence of *enteric fever* is noted. 578 cases were notified and 153 deaths were registered as due to this cause (see this *Bulletin* 1939 Supp. p. 254*). T.A.B. inoculations numbered 32 166. At the Kingston Public Hospital 96 in-patients were treated for this cause and at the District Hospitals there were 350 in-patients and 29 out-patients. The policy adopted is to carry out mass inoculations in any district where a case occurs and also to inoculate all school-children as a routine measure. At the Laboratory agglutination tests were applied to 3 072 samples of blood serum. 518 agglutinated positively with *Bact. typhosum* and 460 gave doubtful reactions.

Notified cases of *dysentery* numbered 161 distributed as to 139 amoebic, 2 bacillary and 20 undefined infections. At the Kingston Public Hospital 67 in-patients were treated (56 amoebic cases) with 5 deaths and at the District Hospitals 32 cases (21 amoebic) and 46 out-patient cases. Deaths in Jamaica due to *diarrhoea and enteritis* numbered 554.

During the year 1,376 cases of *pulmonary tuberculosis* were notified and 1 083 deaths were ascribed to this cause. It is noted that 55 per cent of the notified cases were from the adjacent parishes of Kingston, St. Andrews, St. Catherine and Clarendon (see this *Bulletin* 1939 Supp. p. 254*). The new *Kingston Tuberculosis Dispensary* was opened early in the year and over 5 000 new cases attended during

1938 for examination and in addition 9 178 attendances were recorded by old patients. A special Tuberculosis Report is presented as an Appendix to the Report under review. Special efforts have been made to meet the urgent need for additional bed accommodation for tuberculous patients. Special wards have been completed at certain District Hospitals making available 80 beds another 50 are provided temporarily at Kingston, and Local Boards of Health provide approximately 168 beds in Poor Houses primarily for advanced pauper cases. At the Laboratory 1,867 specimens of sputum were examined and 398 were positive with *Mycobacterium tuberculosis* (see also below in the section *Scientific*).

Pneumonia caused the deaths of 747 persons in Jamaica during 1938 and 2,123 hospital in-patients were treated for various diseases of the respiratory system with 922 deaths.

Twenty-five cases of leprosy were notified at the end of the year there were 279 known lepers in the Island and of these 160 were in the Lepers Home. The Medical Officer in charge of the Lepers Home contributes his usual report of the year's work. At the Laboratory among 320 smears examined 174 were positive with *Mycobacterium leprae*.

The only references to helminthic infections relate to school-children and these are meagre. In one place it is said to be probable that at least 70 per cent. of the children in rural areas harbour worms, in another as regards intestinal parasites the degree of infestation is unknown. Among 6,352 faecal specimens examined at the Laboratory 1,256 contained hookworm, 237 ascari and 726 trichinae.

The work of the special clinics for Venereal Diseases makes it clear that the programme of control will have to be enlarged if the problem is to be effectively dealt with. Following the visit and recommendations made by Lt-Col L. W. HARRISON, Adviser to the Ministry of Health on Venereal Diseases, certain improvements have been introduced at the Kingston Clinic and other recommendations are under consideration. A special report on the control of venereal diseases is presented in the Report under review and details of cases treated are set out in great detail. In-patients treated for syphilis numbered 1 604 and for gonococcal infections 1 160 and out-patients treated at all centres for these infections were 14 713 and 12,848 respectively (see also this *Bulletin*, 1939 Supp., p. 255). At the Laboratory 32,006 Kahn tests were carried out 12,356 gave positive, and 1,216 doubtfully positive reactions. Examinations of smears for gonococci numbered 2,126 and of these 783 gave positive findings.

Reports on the results of the Yaws Control Programme (see this *Bulletin* 1939 Supp. pp. 255* 256*) continue to be favourable and the marked reduction in incidence of the disease in certain areas is said to be beyond question. In four parishes of high endemicity 71,251 persons were censused and 7.2 per cent. found to have yaws lesions.

Other diseases.—Although nephritis continues to be a serious cause of morbidity and mortality no reference to the disease appears in the text of the Report (see this *Bulletin*, 1939 Supp. p. 256*). During the year nephritis caused the deaths of 821 persons in Jamaica at the Kingston Public Hospital 104 in-patients were treated and 28 died, but for the District Hospitals the disease is masked under the group *Diseases of the Genito-Urinary System* for which 3,221 in-patients (154 deaths) and 6 142 out-patients were treated. A further increase in the mortality due to Cancer is recorded with 401 deaths. Eye

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diseases skin diseases diseases of the digestive system and rheumatism were responsible for large numbers of cases treated at various centres.

Scientific—Specimens examined during the year totalled 70,810 this figure does not include the examination and classification of 14,314 mosquitoes and larvae nor of any of the special procedures connected with research work etc. Descriptive and tabular details of the work are presented the principal specimens dealt with and results recorded have been mentioned in the preceding notes. *Research work* was concerned with the problem of Ackee (*Blighia Sapida*) Poisoning The work was carried out by Drs K Leigh EVANS and L. E. ARNOLD and preliminary results published in the *Transactions of the Royal Society of Tropical Medicine and Hygiene* Vol. XXXII No 3 Nov 1938.

Special Reports contained in the Report under review include the following —

- (a) Report on Venereal Diseases by Dr S E FERREIRA
- (b) Report on Tuberculosis.
- (c) Special Tuberculosis Vaccination Studies in Jamaica by Dr F W FLAHERTY

Financial—Total expenditure on Medical Department Services during 1938 amounted to £237 161 a sum which represents 9 per cent. of the total expenditure of the Colony during the same year

CAYMAN ISLANDS (1938.)

The Cayman Islands, three in number namely Grand Cayman, Little Cayman and Cayman Brac, form a dependency of Jamaica and lie between 79°33' and 81°30'W longitude and 19°16' and 19°45'N latitude. They have a total area of about 104 square miles.

The Annual Medical Report for 1938 had not been received at the time of going to press on February 26th 1941

TURKS AND CAICOS ISLANDS (1938)

The Turks and Caicos Islands geographically are a sort of annex of the Bahamas group but in 1873 were annexed to Jamaica which lies about 450 miles to the south west. They are situated between 21° and 22°N latitude and 71° and 72°37'W longitude and have an area of about 168 sq miles The chief Island, Grand Turk, is 6½ miles long, 1½ broad

Vital Statistics—The Report observes The general native population was 5,300 Estimated (Census 1921) If this statement means that an estimate was made (5,300) on the basis of the 1921 Census result, then the population has declined by about 300 persons (see this *Bulletin* 1938 Supp p 251*) Registered births numbered 205 and deaths 110 On the basis of a population of 5,300 the birth rate would be 38.7 per 1,000 (not 39.7 as stated) and the death rate 20.7 per 1,000 Infant deaths are not recorded but the infant mortality rate is said to have been 122 (per 1,000 live births?) The Medical Staff consists of a single Medical Officer (Dr R. O'REILLY)

School Hygiene—Under this heading references are mainly concerned with the dental inspection of school-children. 439 children received free treatment during the year. Teachers in charge of schools were given instructions in elementary hygiene.

Supplies of Cod Liver Oil and Condensed Milk were distributed by Government to school-children especially in the Caicos Islands where drought conditions prevailed.

Public Health Sanitation &c.—During 1937 the health of the Dependency is reported to have been "fair". The Inspector of Nuisances reported that the sanitary condition of the island was satisfactory. Unemployed labourers at the close of the salt season were provided with relief work by Government. Fresh vegetables and fruit were received irregularly from other islands.

Hospitals &c.—A brief statement supplies details of the year's work at the Hospital, Grand Turk. Admissions numbered 35 and 8 hospital deaths were recorded. The principal diseases treated during the year were the following—

Pellagra was again the principal cause of morbidity. Fourteen patients were admitted to hospital and 4 died. At the Dispensary between 35 and 40 infants were treated for diseases of the digestive tract while cases of ill health undoubtedly due to dietary deficiencies were observed and treated.

Of *tuberculosis* the Report observes. There were about 10 cases. Four cases were admitted to hospital. *Skin diseases* such as *eczema impetigo* etc. were more or less prevalent among children and young women. Other diseases dealt with during the year included sporadic cases of *measles* and *chickenpox*, a few cases of *intestinal infection* and among adults muscular and articular *rheumatism* acute and chronic *nephritis* and *malaria*.

With regard to *Admiral's diseases* it is stated that four cases of *syphilis* were treated and that a number of school-children were treated with *ascorbic acid* with very satisfactory results.

No cases of *primary syphilis* came under observation but 8 cases of *gonorrhoea* were treated at the Dispensary.

Leprosy in the Caicos Islands remains much about the same. Two cases were discovered at Salt Cay and isolated in the hospital grounds.

Financial—Hospital services cost £170. Pauper relief £488. Lepers £145. Lunatic £184 and a subsidy for the dental treatment of school-children £72.

LEEWARD ISLANDS.

Antigua (1938).

Antigua with Barbuda and Redonda, forms one of the Presidencies of the Leeward Islands. It lies in W longitude 61° 45' and N latitude 17° 6'. Its circumference is about 54 miles and area 108 sq. miles, or about half the size of Middlesex.

Vital Statistics—The relevant facts presented in the Report under review are taken from the Returns of the Registrar-General and read as follows—

Estimated Population	Registered Births	Birth Rate	Registered Deaths	Death Rate	Infant Deaths	Infant Mortality Rate
35 123	1 188	34.1	582†	16.9	176	146.9

† In addition there are 60 stillbirths. In previous issues of this Supplement attention has been called to the publication of what appear to be inaccurate birth, death and infant mortality rates in the Antigua Report. In the Report for 1938 the birth rate is given as 35.3 per 1 000 the death rate is calculated (erroneously) on the basis of registered deaths plus stillbirths, while the infant mortality rate is said to be 141.8. It is suggested these matters might receive the attention of the authorities concerned.

The Medical Staff comprises the Senior Medical Officer (Dr J. E. WRIGHT) and five Medical Officers.

Maternity and Child Welfare Work—This continues to be carried out along the lines previously described with no change in the number of midwives employed (see this *Bulletin* 1939 Supp. pp. 258*-259*). At the three established crèches 8,992 infants were dealt with and 800 births were registered. Pupil midwives continue to receive instruction at the Holberton Hospital.

School Hygiene—The references to this important branch of Public Health work are meagre. The Dental Surgeon reports that out of 3 651 children on the registers 1 560 received dental treatment and that the bigger children are realizing the importance of oral hygiene. The health of the boys at the Training School is reported to have been very good.

Public Health Sanitation etc.—There is little that is new to be summarized under this heading. *Anti-malarial work* continued to receive close attention and the construction of new drains eliminated to a great extent the number of potential breeding places of mosquitoes. A *Malaria Survey* is to be carried out and in connexion with this specimens of mosquito larvae were collected and sent to the British Museum for identification. The Report contains a statement showing the breeding places of *Anopheles* classified by natural ecological areas. With regard to *sewage and refuse disposal* methods remain as previously described. In the Districts signs of sanitary improvement are reported but it is added conditions are still below what may reasonably be expected. In the City of St. John 8 additional septic tanks were installed. *Water supplies* in country districts are very diverse in origin comprising springs, catch water systems tanks and ponds though much has been done to effect improvements supplies in some areas are precarious and uncertain. *Malnutrition* vitamin deficiency and overcrowding are important factors in lowering resistance to disease. In the City of St. John a committee was appointed to investigate the handling and sale of the *milk supply* among other recommendations made they suggested the appointment of a Milk Analyst the destruction of animals suffering from bovine tuberculosis and the consideration of pasteurization. In the course of his Report the Veterinary Surgeon briefly discusses the dairy industry the meat inspection service etc.

Hospitals Dispensaries etc.—The cost of maintenance of the Holberton Hospital—which falls far short of modern hospital ideals in design structure and equipment—is said to be high much of the

wood of which the hospital is built is rotten or riddled with termites. A new hospital is badly needed.

The training of nurses and midwives continued to be carried out at the Holberton Hospital. There is urgent need for the provision of a more efficient intelligent and interested nursing service in the country districts, but at present conditions and prospects are so unattractive as to offer no inducement to the better class of girl to adopt nursing as a profession.

Dispensaries there are but the number of these treatment centres is not stated except for District C where there appear to be four. The Medical Officer District D reports dispensary attendances averaging over 1 000 per month.

The following statement summarizes the year's work carried out at various institutions in the Presidency —

Institution	Admitted	Treated	Died
Holberton Hospital	—	1 102	91
Laboratory	82	173	24
Finsen Institute	144	132	88
Prison	1 628 (unmales)	19	0

Malaria was responsible for 1 800 cases and 14 deaths the decline in incidence and mortality being ascribed to lower rainfall during 1935 and to the close attention paid to anti-malarial work to which brief reference has been made in the section Public Health above. Malaria continues to be the chief cause of disability in most districts where many of the villages are located on the borders of swamps or on the banks of small streams. At the Holberton Hospital among the 17 in-patient cases, 10 were *subtertian*, 3 were *quartan* and 4 were *cerebral* cases of the disease. At the Laboratory where 1 440 blood films were examined for the presence of malarial parasites 87 gave positive findings among the latter were 72 *subtertian*, 10 *quartan*, and 5 contained crescents.

Filaria is also responsible for considerable morbidity. Though only 181 cases were recorded during the year the disease is believed to be more prevalent than recorded data suggest for cases are seen only when internal manifestations such as *elephantiasis*, etc. compel sufferers to seek medical aid.

The incidence of *enteric fever* differed little from that experienced in previous years. 17 cases with 6 deaths were recorded. Cases occurred sporadically mostly during September and October. At the Laboratory the Widal test was applied to 32 specimens of serum 17 positive reactions being recorded. *Dysentery* accounted for 278 cases and 30 deaths during the year under review. Cases of *diarrhoea and enteritis* numbered 780 and 49 deaths were ascribed to this cause. The presence of large numbers of animals in close proximity to dwellings with their attendant flies, doubtful water supplies and unsanitary methods of sewage disposal are largely responsible for the prevalence of gastro-intestinal ailments.

The incidence of *pulmonary tuberculosis* is high among the natives who possess poor resistance to the disease. Low standards of living, overcrowding, poor housing, and ignorance of the simple rules of hygiene are factors contributing to the spread of the disease. During the year 119 cases with 30 deaths were notified. At the Holberton

Hospital where 19 cases of tuberculosis (all forms) were treated 12 were *pulmonary* cases resulting in 9 deaths. There is no sanatorium or tuberculosis ward available for the accommodation of patients. Specimens of sputum examined at the Laboratory numbered 101 and of these 11 were positive with *Myco tuberculosis*. Among other *respiratory ailments* treated during the year were 1,997 cases of *bronchitis* causing 25 deaths 1,845 cases of *influenza* with 8 deaths and 76 cases of *pneumonia* resulting in 45 deaths.

Helminthic diseases are endemic and are due almost exclusively to the nematodes parastic in man. *ascaris* infection is very prevalent in children especially in the country districts but adults are more often infected with *Strongylidae*. An investigation of the prevalence of *Hookworm* in the Bolans District is being carried out.

With regard to the treatment and control of *leprosy* it is stated there are 35 inmates of the Leper Home and 32 lepers are under treatment in their own homes. (In another section 72 cases of leprosy with 3 deaths are mentioned.) Additional accommodation has been provided at the Leper Home by the erection of two huts with capacity for twelve inmates. Of 10 nasal smears examined at the Laboratory one was positive with *Myco leprae*.

Veneral diseases are chronically endemic everywhere and constitute a health problem of paramount importance in the Presidency the cause of this deplorable state of affairs lying in the social and economic condition of the people. During the year 1,434 cases of *syphilis* with 36 deaths and 238 cases of *gonorrhoea* were recorded (See this *Bulletin* 1939 Supp p 261*) At the Laboratory 1,512 Kahn tests were carried out with positive reactions in 768 cases and among 81 specimens of pus etc. examined *N gonorrhoeae* was present in 32.

The incidence of *yaws* in the Valley District is reported to be improved but still quite high. Failure to eradicate the disease is attributed largely to the lack of co-operation on the part of parents in bringing their children for treatment and (as in the case of *syphilis* and *gonorrhoea*) failure to continue treatment to complete cure.

Nutritional diseases are common especially among young children at the Holberton Hospital of all admissions to the Children's Ward 20 per cent were due to malnutrition and a third of these young patients died. *Pellagra* was responsible for 38 cases and 13 deaths. *Impetigo* is a common cause of skin complaint.

Scientific—During the year 4,542 specimens of various kinds were examined at the Laboratory. The principal findings recorded have already been the subject of brief reference in the preceding notes.

Financial—Total expenditure on Medical Department services during 1938 amounted to £16,176 personal emoluments accounting for £6,955 of the total sum expended.

Dominica (1938)

Dominica, the largest and most southerly island of the Leeward Islands Colony is of volcanic origin. It measures about 29 miles long and 15 broad and has a total area of 304 sq miles, or about double that of the Isle of Wight. It is situated between 15°20'–15°45'N latitude and 61°13'–61°30'W longitude and lies 85 miles south of Antigua.

Vital Statistics—At the end of the year the population was estimated to number 50,617. Registered live births numbered 1,474.

and deaths 648 the resulting birth and death rates being 29.5 and 13.6 per 1 000 of the mid year population. Stillbirths numbered 54 and infant deaths 128 the infant mortality rate being 85.6 per 1 000 live births.

The Medical Staff comprised a Chief Medical Officer (Dr C. N. GRIFFIN) and four Medical Officers.

Maternity and Child Welfare Work—To the Maternity Ward of the Roseau Hospital 290 cases were admitted, 217 confinements took place and one maternal death was recorded. At the Portsmouth Hospital 9 cases of normal labour were dealt with. The weekly ante-natal clinic held at the Out patient Department of the Roseau Hospital was attended by 457 expectant mothers.

Infant Welfare Clinics continued to be held at three centres and were attended by 512 children who made 6 136 attendances. Ten (swiss-midwives are employed in the Districts and there were 82 registered Midwives in the Island.

School Hygiene—The average attendances at 34 primary schools during 1938 was 5 472 among a total school population of 7 758. Work continued to be carried out along the lines previously described (see this Bulletin 1938 Supp p 255* and 1939 Supp p. 282*).

Public Health Sanitation etc—No outbreak of serious epidemic disease was reported during the year under review. Minor drainage of anopheline breeding places continued to be carried out in various areas. General measures of sanitation proceeded along lines previously described. No extensions to existing water supplies are reported. Housing conditions and town-planning schemes are described in some detail. References are again made to the diets of different classes of the population (see this Bulletin 1938 Supp p 253* and 1939 Supp p 282*).

Port Health Work—Quarantine restrictions were imposed in May on arrivals from the neighbouring French Island of Guadeloupe on account of smallpox.

Hospitals Dispensaries etc—The 4 Hospitals and 20 Dispensaries continued to function as usual. To all hospitals 2,296 patients were admitted and 159 hospital deaths were recorded. At the Roseau and Portsmouth Hospitals 2,853 out patients were treated, and at the Dispensaries 80 719 attendances were recorded.

Malaria which had been unduly prevalent during 1937 reverted to normal proportions. 3,368 clinically diagnosed cases were reported by Medical Officers and deaths registered as due to this cause numbered 49 and of these 31 occurred among children under 5 years of age. Altogether 247 in-patients received treatment, but types of infection are defined only for the 119 in-patients at the Roseau Hospital, and among these 5 were benign tertian, 41 subtertian and 73 unclassified. Thirteen cases of filariasis were treated during the year.

Influenza became prevalent in March. Of the 909 cases notified during the year with 13 deaths, 834 of the cases and all the deaths occurred during the four months March-June. There was a slight recrudescence of the disease in September.

No case of smallpox appears to have been reported though a mild outbreak occurred in a neighbouring Island. During the year 1,311 vaccinations were performed in compulsory and 1,913 in non compulsory vaccination areas.

Of enteric fever 14 cases were notified with 3 deaths. All cases were hospitalized, all contacts received T.A.B. inoculation, and all necessary

measures were adopted to prevent spread of the disease. *Dysentery* was responsible for 118 cases and 7 deaths. Among 47 in-patient cases 31 were suffering from the *amoebic* form of the disease. Medical Officers reported 544 cases of *diarrhoea* and *enteritis* among children under 2 years of age with 34 deaths and of these cases 404 occurred in the Roseau District. errors of diet are the predisposing cause of these cases.

Notifications of *tuberculosis* during the year numbered 88 and of these 70 related to the *pulmonary* form of the disease. 59 deaths were recorded 53 being ascribed to pulmonary tuberculosis. *Diseases of the respiratory system* showed considerable prevalence and were responsible for 7 per cent of all cases treated at all centres. hospital cases included 13 cases of *lobar pneumonia* (4 deaths) and 11 cases of *broncho-pneumonia* (4 deaths).

Intestinal parasites were responsible for approximately one-fifth of the cases dealt with at treatment centres during the year. *ascariasis* is widespread and severe cases of *ankylostomiasis* are still met with. Deaths attributed to this group of diseases numbered 34 the majority of them occurring among children under 5 years of age.

There were 30 known cases of *leprosy* three new cases being notified during the year. Construction of the new *Leper Home* was completed and opened in March. A detailed account of this institution number of inmates treatment, etc. is presented.

Veneral Diseases—District Medical Officers treated 341 cases of *syphilis* and 64 cases were treated at the Hospitals the corresponding figures for *gonorrhoea* being 360 and 54 respectively. in addition 8 cases of *soft chancre* and 17 of *lymphogranuloma* were treated in the hospitals.

Yaws appears to have been responsible for about 13 per cent of all cases treated at all centres during the year. Cases notified numbered 1 147 and 4 061 cases attended for treatment. The Sanitary Inspectors are commended for their good work in discovering hidden cases and following up cases under treatment.

Among *other diseases* mentioned in the Report occur the following. During the first quarter of the year 252 cases of *measles* were notified with no deaths due to this cause. *Diseases of the digestive system* were responsible for 11 per cent. of all cases dealt with at hospitals and dispensaries many of the cases being attributable to dietary deficiencies. *Diseases of the skin* also accounted for a high proportion (11.4 per cent) of cases treated during the year within this group *ulcers* figure prominently as well as *eczema* *impetigo* *ringworm* etc.

Financial—Total expenditure on Medical Services during 1938 amounted to £11 009 a sum which represents 15.75 per cent of the total expenditure of the Presidency during the same year.

Montserrat (1938)

Montserrat, named by Columbus after a mountain in Spain, lies in 16°45'N latitude and 61°W longitude 27 miles S W of Antigua. Its length is 11 miles and its greatest breadth 7 miles, and its area 32½ sq miles.

Vital Statistics—The estimated population at the end of the year was 13 670. Registered births numbered 459 and deaths 215 the resulting crude birth and death rates are given as 34.3 and 15.4 per

1 000 respectively [On the basis of *end of year* population the figures would read 35.6 and 15.7 respectively.] *Infant deaths* numbered 58, the infant death rate being 126.3 per 1 000 live births.

The *Medical Staff* during 1838 comprised two Medical Officers, the Medical Officer District No. 1 (Dr N. J. L. MARGETSON) being responsible for the sanitation of the whole Island.

Maternity and Child Welfare Work—In the Maternity Ward of the Glendon Hospital 91 women were treated for *diseases of pregnancy and childbirth etc.* with 3 deaths; these cases included 78 deliveries. *Ante-natal clinics* were held each week and *Child Welfare Work* on a modest scale was carried on during the year. Two Government trained *nurses* continued to do excellent work.

School Hygiene—Owing to pressure of other work the visits of Medical Officers to schools were irregular. The general health of school-children was below the usual standard and many forms of *skin disease* and *dental decay* were evident. Various structural improvements to school buildings were carried out.

Public Health Sanitation etc.—Owing to depressed economic conditions the general health of the people was not satisfactory; nutritional disturbances of varying degrees were commonly observed. The Medical Officer of No. 1 District is responsible for the *sanitation* of the whole Island. The lack of adequate sanitary supervision in the town of Plymouth is to be remedied by the appointment of a full time Sanitary Inspector. Many villages are without adequate *latrine accommodation* but funds have been provided to make good these deficiencies and also to improve methods of *scavenging and refuse disposal etc.* Pipe-borne *water supplies* are available throughout the Island. Steady progress is reported in efforts made to improve housing conditions but much yet remains to be done. The Legislative Council is giving full consideration to the solution of this problem. With a view to improving the nutrition of the people efforts are being made to increase the consumption of milk and home-grown fresh vegetables.

Hospitals, Dispensaries etc.—At the Glendon Hospital (see this *Bulletin* 1839 Supp. p. 285*) 621 in-patients were treated, 28 hospital deaths were recorded and 400 persons received treatment as out-patients. During the malaria epidemic (see below) emergency wards were opened at Trants Estat and 35 patients treated; these wards were closed in December. At the country *dispensaries*, of which there are five, 9,350 attendances for treatment were recorded. The principal diseases dealt with at the hospital and dispensaries during the year under review included the following—

An epidemic outbreak of *malaria* which assumed serious proportions and was the cause of grave concern was the outstanding public health experience of 1838. The outbreak occurred in a village of 400 inhabitants in the Windward District; the first cases appeared in May, were mild in character and *malaria* was not suspected. These were followed by others malignant in type and blood films showed *subtertian* parasites. Anophelines identified as *A. albimanus* (Wied.) were found breeding in an old discarded cistern, and in the Farm River which forms the eastern boundary of the village. Altogether 180 cases were reported with 13 deaths. The comparatively high mortality was ascribed to malnutrition, lack of immunity to the disease, and a preference towards indulging in local remedies in place of quinine prophylaxis.

Among other insect borne diseases it is noticed that 16 cases of *filariasis* were reported (see this *Bulletin* 1939 Supp p 265*)

Though fewer cases of *pulmonary tuberculosis* are said to have been reported in 1938 deaths due to this cause numbered 13 as against 7 in the preceding year. Other diseases of the *respiratory system* caused the deaths of 8 persons this group also accounted for 16 hospital cases and 3 deaths.

One case of *amoebic* and one of *bacillary dysentery* appear in the Hospital returns. The disease was responsible for 2 deaths in the Island while *diarrhoea and enteritis* was responsible for 22 deaths 16 of these occurring among children under 2 years of age.

Helminthic diseases are not mentioned in the text of the Report (see this *Bulletin* 1939 Supp p 265*) at the Glendon Hospital 6 in-patient cases of *helminthiasis* and one of *schistosomiasis* were treated.

Veneral Diseases—Five primary cases of *syphilis* were reported and treated the Report continues. Secondary manifestations have not been common but tertiary manifestations were frequently seen. The incidence of *gonorrhoea* is not high. Venereal diseases generally are said to account for about 12 per cent of the total morbidity. *Yaws* has declined steadily in recent years but active measures against the disease continue. Treatment is free and injections given during the year numbered 700. It is said that *ulcers* due to the disease are fairly often met with among children.

Financial—Expenditure on Medical and Sanitary Services during 1938 amounted to £3 633 a sum which represents about 12 per cent. of the revenue of the Presidency. (A special vote was necessary for the malaria epidemic and for the maintenance of the Emergency Wards at Trants Estate.)

St Christopher and Nevis with Anguilla (1938)

The islands of St. Christopher and Nevis with Anguilla are part of the Lesser Antilles group, and constitute one of the five Presidencies forming the Leeward Islands Colony in the West Indies. Their total area is about 150 sq miles.

The Annual Medical Report for 1938 had not been received at the time of going to press on February 28th 1941

Virgin Islands (1938)

A cluster of islands to eastward of and adjacent to Porto Rico the largest in the group belonging to Great Britain is Tortola, which is situated in 18°27'N latitude and 64°39'W longitude. The total area of the British Colony (consisting of about 32 islands) is 58 sq miles.

Vital Statistics—The estimated population for the year under review was 6,348. Registered births numbered 182 and deaths 121 the resulting birth and death rates being 29.9 and 19.0 per 1 000 respectively. There were 42 infant deaths so that the *infant mortality rate* would be 230.8 per 1 000 births. [The Report quotes this rate as 7.2 per 1 000 which looks as though the calculation was erroneously based on a mid-year population.]

Births are classified by sex for each of the six Districts. Deaths are classified by cause and District and by age and District. The Medical Staff consists only of Dr D P WAHLING, Commissioner of the Virgin Islands who also performs the duties of Medical Officer. *Maternity and Child Welfare Work*—The Hospital maintains its popularity with maternity cases. 53 deliveries out of a total of 182 for the Presidency were conducted with no maternal deaths. No mention is made of the Welfare Clinic inaugurated in 1937 (see this Bulletin 1939 Supp. p. 270*).

Public Health Sanitation etc—The general health of the Presidency was not so good as that experienced in 1937 when only 68 deaths were registered as against 121 in the year under review. As no specific mention is made of methods of sewage and refuse disposal it is presumed these remain as previously described (see this Bulletin 1937 Supp. p. 257* and, 1939 Supp. p. 270). Conditions relating to water supplies remain unaltered. If a grant could be obtained from the Colonial Development Fund it would be possible to implement a scheme which aims at bringing water into Road Town from a spring about two miles distant (see this Bulletin 1937 Supp. p. 256*). The Corporal of Police acts as Sanitary Inspector under the direction of the Medical Officer to whom he submits a monthly report of his work. During the year no infringements of the regulations of the Board of Health were reported.

Hospitals Dispensaries etc—During the year 201 patients were admitted to the Tortola Cottage Hospital, 206 were treated and 9 died. Out-patient cases are not mentioned.

Ten mild cases of malaria were treated. 1938 was a dry year and no special anti-malaria measures were necessary. An outbreak of typhoid fever and diarrhoea occurred between June and October. There were seven admissions to hospital and three deaths due to typhoid. The outbreak was probably due to the prolonged drought during which well supplies ran low but no definite source of infection was discoverable. Functional disorders of the stomach and intestines are the commonest complaints treated and account for approximately 75 per cent of all out-patient cases dealt with. Fourteen deaths were ascribed to gastro-enteritis, two to dysentery and three to carcinoma of the colon.

Respiratory diseases were responsible for 6 hospital admissions and one death. These included two cases of tuberculosis (one fatal pulmonary case). On the other hand seven deaths were due to pulmonary tuberculosis in the Islands as a whole, 8 to bronchitis and 3 to broncho-pneumonia.

Though only 4 patients were admitted to hospital for circulatory diseases, 14 deaths were recorded as attributable to cardiac failure during the year and all the 17 persons whose deaths were ascribed to senility had varying degrees of arterial hardening.

Venereal diseases—Cases of active syphilis are rarely seen, but gonorrhoea and its complications are more common. 1 case has almost completely been stamped out. Two or three cases of chronic ulceration are under treatment.

Financial—Only Hospital finance is mentioned. For 1938 a sum of £404 was budgeted for but this vote was over-spent by £9 4s. 6d. making total hospital expenditure for the year under review amount to £413 4s. 6d.

WINDWARD ISLANDS

Grenada (1938)

Grenada the most southerly of the Windward Islands lies between the parallels of 12°30' and 11°58'N latitude and 61°20' and 61°35'W longitude. Its length is 21 miles and greatest breadth 12 miles and its area 133 sq miles, or about half that of Middlesex. Trinidad is about 90 miles south of it and St. Vincent 68 miles to the north-east, with small islands, the Grenadines between them part attached to the government of Grenada and part to that of St. Vincent. Carriacou the largest has an area of 8,467 acres.

Vital Statistics—The estimated population at the end of the year was 89 415. Registered births numbered 2,635 and deaths 1,348 the resulting crude birth and death rates being 29.8 and 15.2 per 1 000 respectively. The infant mortality rate was 121.2 per 1 000 births.

The Medical Staff during 1938 comprised a Senior Medical Officer (Dr E. COCHRANE) a Resident Surgeon and eight District Medical Officers.

Maternity and Child Welfare Work—At the three Hospitals in the Colony 621 maternity cases were dealt with and 5 maternal deaths occurred. The work of the *Baby Welfare League* was successfully continued throughout the year. Services remain as described in this *Bulletin* 1939 Supp. p. 272*.

School Hygiene—During the year 18 657 children were examined and 13 598 found to be apparently healthy. Among the remainder 1 642 harboured helminths 1 088 showed dental defects 1 072 were affected with skin diseases 384 with ulcers and 112 with yaws. The diagnosis of helminthic infections rests entirely on clinical grounds and cannot be regarded as accurate. It is added that the results give no indication of the amount of malnutrition met with among the children.

Public Health Sanitation etc—The usual routine anti-malarial measures were carried out and a certain amount of drainage and reclamation work completed. With regard to sewage disposal it is noted that the new water-carriage system being installed in St. George's is almost completed and considerable progress is also reported with the installation of bore-hole latrines in suitable areas. Methods of refuse disposal remain as previously described. No further water supplies were installed during the year. Despite economic distress none of the well known deficiency diseases were encountered, though the less marked symptoms of ill balanced diets are seen. A grant of £5 000 was allocated to improve the housing conditions of the wage-earning classes (see also this *Bulletin* 1939 Supp. pp. 272*-273*). Regular inspections continued to be made of premises where food and drink are manufactured or exposed for sale. A detailed account of the year's work is presented. A successful *Health Week* was held in July 1938.

The Sanitary Personnel comprises one Senior Sanitary Inspector and seven District Sanitary Inspectors. Two of the four candidates who sat for the Royal Sanitary Institute Examination in 1937 were successful (see this *Bulletin* 1939 Supp. p. 273*).

Port Health Work—No disease under the Quarantine Regulations found entry into the Colony during 1938. Restrictions continued to be imposed against arrivals from certain ports in Central and South America.

Hospitals, Dispensaries, etc.—There is no change in the number of *Hospitals, Dispensaries or Medical Visiting Stations* (see this Bulletin 1939 Supp. p. 273*). At the General Hospitals 2,847 patients were admitted, 2,936 were treated and 120 died, while the 10,314 cases dealt with at the Medical Visiting Stations included 1,055 confinements and 1,580 infants attended in their homes. A considerable proportion of the cases attending treatment centres consists of young children suffering from *malarial, helminthic and intestinal infections*. At the Dental Clinic 1,992 patients were dealt with.

The training of probationer nurses was continued at the Colony Hospitals.

Recorded cases of *malaria* numbered 7,648 with 89 deaths. The decline of incidence in District I is gratifying and attributed to the systematic drainage and reclamation work carried out in that area. greatly diminished incidence is also reported in District III. Hospital in-patients numbered 521 and of these 7 died. types of infection are not defined.

The incidence of *influenza* which was of a mild type was slightly increased. how many cases were recorded is not stated. The 1937 epidemic of *whooping cough* (see this Bulletin 1939 Supp. p. 275*) continued through the first half of 1939. at the Carriacou Hospital alone 603 in-patients were treated and deaths in the Colony due to this cause numbered 60.

Notified cases of *enteric fever* numbered 23 with 8 deaths. in each case diagnosis was made solely on clinical grounds. The 8 deaths appear to have occurred among the 20 patients treated in hospitals. During the year 482 contacts received T.A.B. inoculation. A small epidemic of *dysentery* occurred in Carriacou. 13 cases with 3 deaths were notified. There were also 1,400 cases of *diarrhoea and enteritis* with 185 deaths. this outbreak caused a considerable increase in the infant mortality rate.

Of *pulmonary tuberculosis* 83 cases were notified. of the 82 deaths ascribed to all forms of tuberculosis in the Colony 72 were due to the pulmonary form of the disease. The need to organise a scheme for the clinical and fluoroscopic examination of contacts is emphasised.

Helminthic Diseases—Hospital returns show that 1,407 in-patients were treated, and of these 34 were suffering from *ankylostomiasis*. As regard the latter infection it is stated that until proper surveys can be made conjectures as to its extent, based on purely clinical grounds, are of little value (see this Bulletin 1939 Supp. p. 274).

No new cases of *leprosy* were notified. Among the 12 inmates of the Loper Settlement two deaths were recorded during the year.

Veneral Diseases—A decline in the numbers of recorded cases is noted. cases of *syphilis* numbered 539 and of *gonorrhoea* 736. Veneral diseases are said to be widespread and to constitute a problem of grave importance (see this Bulletin 1939 Supp. p. 275*).

There was again an increase in the numbers of cases of *yaws* presenting themselves for treatment 2,392 as compared with 2,142 in the preceding year. Numbers are not only increasing but the proportion of cures is said to be falling. There is apparent unwillingness to seek treatment during the early stages of the disease, and failure to attend regularly until cure has been effected. It is said that intra-muscular injections of N.A.B. and the resultant pain, especially in the case of children, is largely responsible for irregular and infrequent attendances. During 1939 *Acetylarsen* is to be used.

Other Diseases—It is said that the proportion of infants brought for anti-smallpox vaccination is steadily declining. Hospital in patients treated for *pneumonia* (all forms) numbered 35 with 13 deaths while *other respiratory diseases* were responsible for 108 cases and one death.

Nephritis caused the deaths of 49 persons in the Colony and hospital in patients treated for this cause numbered 49 with 4 deaths.

Financial—Total expenditure on Medical and Sanitary Services during 1938 amounted to £21 770 a sum which represents 12·6 per cent of the revenue of the Colony during the same year.

St. Lucia (1938)

The Colony of St. Lucia is the largest and most northerly of the Windward Islands in the Lesser Antilles group West Indies. It is 27 miles long and 14 miles broad and has an area of 238 sq miles, or slightly larger than the Isle of Man.

Vital Statistics—The population was estimated to number 69 084. Registered births numbered 2,120 and deaths 1 023 the resulting crude birth and death rates being 30·7 and 14·8 per 1 000 respectively. Infant deaths numbered 209 and the *infant mortality rate* 98·6 per 1 000 live births.

The Medical Staff comprised a Senior Medical Officer (Dr. H. D. WEATHERHEAD) a Resident Surgeon, five District Medical Officers and a Supernumery Medical Officer.

Maternity and Child Welfare Work—Valuable work continued to be carried out by the Maternity and Child Welfare Centre in Castries. In rural districts the Government Midwife in each village provided necessary services. Returns of the Victoria Hospital show that 635 maternity cases were dealt with during the year there were 8 infant deaths but no maternal mortality.

School Hygiene—There are no whole-time school medical officers in the Colony the regular inspection of schools and school-children being carried out by District Medical Officers. During the year a *nutritional survey* was undertaken the results of the survey revealed that about 10 per cent of the school-children are under nourished. Recommendations were made to Government in connexion with supplementing the meals of necessitous children. *Malaria* is said to be the greatest cause of ill health among school-children.

Public Health Sanitation etc—The general health of the Colony remained satisfactory during the year under review. *Anti malarial work* on a much larger scale than usual was made possible by funds provided by an Imperial Grant and plans were prepared for permanent work in the more heavily infected areas. The report of the Sanitary Inspector supplies details of mosquito-prevention work. Methods of *sewage* and *refuse disposal* remain unchanged (see this *Bulletin* 1936 Supp. p 253* and 1939 Supp. p 276*). *Water supplies* appear to be mentioned only in the Report of the Medical Officer. Fifth District brief reference was made to these matters in the preceding issue of this *Supplement*. Housing conditions in Castries leave much to be desired on certain sugar estates improvements have been introduced but in other rural areas conditions are characterized as deplorable. *Dietary deficiencies* are again a subject of comment following upon recommendations of the Standing Committee on Nutrition steps are

being taken to provide children attending the Maternity and Child Welfare Centre with milk, etc. (see this *Bulletin* 1939 Supp. p. 276*). Examinations of milk and water samples was continued throughout the year. Full details of the work carried out by the Sanitary Department are presented in the usual annual report contributed by the Chief Sanitary Inspector.

Port Health Work.—Forty ships were boarded during the year with a single exception all were from ports in the Caribbean Sea or Central and South America. Quarantine restrictions were imposed on Guadeloupe on account of reported smallpox. No quarantinable diseases were recorded during the year.

Hospitals Dispensaries etc.—Various improvements to the building and equipment of the Victoria Hospital were carried out. In-patients admitted numbered 2,156 (in the classified returns shown as 2,856) and 131 hospital deaths were recorded. There are *dispensaries* in all Districts but Medical Officers do not always state the numbers of patients treated during the year (see this *Bulletin* 1939 Supp., p. 277*). Other institutions include the Royal Gaol where the Prison Medical Officer saw 1065 cases, and the Mental Hospital where 27 patients were admitted, 133 treated, 9 discharged, and 8 died during the year.

Malaria continued to be the principal cause of ill-health in the Colony all District Medical Officers comment upon its incidence in their respective areas. Excessive rains produced a dangerous situation and larger anti-malarial measures were undertaken (see above *Public Health* and this *Bulletin* 1939 Supp., p. 277*). At all dispensaries 7082 cases were treated, the majority in Districts II, IV and V where there are extensive swamps. At the Victoria Hospital the 154 in-patient cases included 3 of *benign tertian*, 2 of *blackwater fever* and 149 were unclassified. Deaths in the Colony due to malaria numbered 106. At the Laboratory where 151 blood films were examined, 25 contained *susceptus*, 6 *quartan* and 4 *benign tertian* parasites.

The incidence of *pulmonary tuberculosis* remains for all practical purposes unchanged with 51 cases notified during the year under review. There are no isolation or treatment centres nor organized clinics in the Colony. During the year 40 deaths were ascribed to this cause. At the Laboratory among 40 specimens of sputum examined 8 were positive with acid-fast bacilli. Fourteen cases of *lobar pneumonia* were notified at the Victoria Hospital 6 cases of *broncho-*, 13 of *lobar* and 18 cases of undefined pneumonia were treated with 10 deaths, while in the Colony as a whole pneumonia caused the deaths of 40 persons. These affections and other respiratory ailments are discussed in the reports of District Medical Officers.

Enteric fever showed decreased incidence with 28 notified cases. 21 cases were treated in hospital and 7 died. All contacts were inoculated with T.A.B. vaccine. Five cases of *bacillary dysentery* were reported. Frequent mention is made by District Medical Officers of the prevalence of diseases of the digestive system mainly attributed to faulty feeding methods. *Diarrhoea* and *enteritis* caused the deaths of 36 children under 2 years of age during 1939.

For *helminthic diseases* 7947 patients received treatment during the year these cases were diagnosed clinically. At the Laboratory where 527 faecal specimens were examined, 298 contained *ascylostoma* ova, 206 *ascaris*, 400 *trichuris* and 17 *schistosoma* (see also this *Bulletin* 1939 Supp., p. 278*).

Five new cases of *leprosy* were admitted to the Leper Asylum where 30 patients were under treatment and one died during 1938.

The Venereal Diseases Clinic in Castries continued to function throughout the year. 272 cases of *syphilis* and 138 cases of *gonorrhoea* were dealt with. In the Districts 689 cases of *syphilis* were also treated. District Medical Officers discuss V.D. incidence in their respective areas but without always stating the numbers of cases treated. *Gonorrhoea* appears to vary between district and district—in one area it is rarely seen in another very prevalent. At the Victoria Hospital 68 in patients were treated for *syphilis* 36 for *gonorrhoea* and 57 for other V.D. At the Laboratory 125 Kahn tests were carried out but findings are not recorded. In the Colony as a whole 96 deaths were registered as due to venereal diseases.

There was a further decrease in the incidence of *yaws* for only 368 cases were reported in 1938.

Other diseases—During the latter half of the year a mild epidemic of *influenza* occurred and in many cases broncho-pneumonia developed. In the First District 537 cases of *ulcers* were treated in the Fourth District *skin diseases* accounted for 2,811 cases while in the Fifth District *skin diseases* form a large proportion of the cases treated and many cases of tropical ulcer are seen. The heavy rains in November caused a disastrous landslide when nearly 100 persons were killed and 40 seriously injured.

Scientific—At the Laboratory 1 747 specimens of various kinds were examined. The principal specimens received and findings recorded have already been the subject of brief mention in the preceding notes.

Financial—Total expenditure on Medical Department Services amounted to £12 405 as compared with £10 993 in the preceding year.

St. Vincent (1938)

The West Indian Colony of St. Vincent includes the Island of St. Vincent the second largest of the Windward Islands, and five of the Lesser Grenadines, a chain of islands lying between Grenada and St. Vincent. The island of St. Vincent is 18 miles long and 11 miles broad and has an area of 133 sq. miles, or nearly that of the Isle of Wight. The total area of the five smaller islands is some 17.3 sq. miles.

Vital Statistics—The relevant facts taken from the Report of the Registrar-General for 1938 read as follows—

Estimated Population	Total Births	Birth Rate	Total Deaths	Death Rate	Infant Deaths	Infant Mortality Rate
58,381	2,215	37.9	1 039	17.8	293	132.3

The above data are supplemented by useful interpretative commentaries. In addition mortality data are tabulated in a series of Tables which present deaths by sex and in age-groups principal causes of deaths according to local distribution and seasonal prevalence a classification of 89 titles according to District distribution together with diagrammatic charts illustrating the trend of *infant*

morbidity and mortality due to *pulmonary tuberculosis* *enteric fever* and *measles* over a series of years.

[Special Note.—It would be interesting to know why the classification of diseases in Table 5 differs from that adopted by hospitals in the Colony. In Table 5 titles are numbered consecutively but each disease-title is followed by a number in parentheses. It would be reasonable to assume that the latter number relates to the corresponding title-number in the hospitals nomenclature but such is not the case as the following examples will demonstrate —

Numbered Titles in Table 5
No. 9 Dysentery (13)

Numbered Titles in Hospital Returns
No. 9 Whooping Cough (No. 13 is

10 Plague (14)

Stumps)
10 Diphtheria (No. 14 is
Cholera)

11 Tuberculosis, respir
(or) (27)

11 Influenza (No. 23 is Enceph
litis Lethargica)

and so on. These conflicting methods of classification are confusing.]
The Medical Staff comprises a Senior Medical Officer (Dr. H. B. Gregory) acted in this capacity pending the arrival of Dr. J. A. Henderson, one Supernumerary Medical Officer, seven District Medical Officers, one Superintendent Medical Officer and one Resident Surgeon at the Colonial Hospital.

Maternity and Child Welfare Work—The Report observes of maternity work at the Colonial Hospital. There were 352 admissions of which 283 were cases of normal labour. On turning to the Hospital Returns for all hospitals it is noted that 309 women were treated for puerperal conditions and among these were 360 cases of normal labour.

The *Kingstown Child Welfare Clinic* continued to function successfully and with increasing popularity under the charge of the Matron of the Colonial Hospital. Total attendances numbered 850 and of these 184 were new cases. Following a special course of training the nurse qualified in general nursing (see this *Bulletin* 1939 Supp. p. 279*) undertook the supervision of maternity and child welfare work in the Colony. In the course of her district visits special attention was devoted to dieting and hygiene of pregnancy, infant feeding and hygiene etc. It is hoped to inaugurate a Maternity and Child Welfare League in 1939.

There are 11 nurse-midwives and three others stationed in the Southern Grenadines. These women attended 257 labour cases, paid 591 visits to expectant mothers and visited 10,485 children at their homes.

Four midwives received training during the year and were awarded certificates of proficiency.

School Hygiene—The usual half yearly examinations of school children were carried out by District Medical Officers. No details are supplied. For the first time a special investigation was devoted to the discovery of the number of children suffering from malnutrition. The work was confined to Kingstown where 789 children were examined. The principal findings were (a) about 14 per cent were found to be under-nourished (b) the great majority of under-nourished children were found among those of school-age who did not attend school and (c) the most common manifestations were dental caries, angular stomatitis and anaemia.

At the Dental Clinic 339 children received treatment.

Public Health Sanitation etc—Routine anti mosquito measures continued to be carried out throughout the Colony. Methods of *sewage disposal* remain much as described in previous issues of this *Supplement* except that in and around Kingstown septic tank systems continue to be installed while during the year 691 pit latrines were erected in rural districts and a large number of latrines were repaired. There is nothing new to report in connexion with methods of *refuse disposal*. No additions to existing *water supplies* were made. Chlorinators for sterilizing supplies to Kingstown and its suburbs have been ordered (see this *Bulletin* 1938 Supp p 271* and 1939 Supp p 279*). No improvement in the *housing* of the poorer classes is recorded the problem will have to be dealt with by a large-scale Government controlled scheme. The majority of the Government built houses are now occupied and the Public Works Department is experimenting with a view to producing a type of peasant cottage that shall be cheap durable and sanitary. The claims of *labour* are receiving the increased attention of Government the establishment of a Labour Department provides the necessary machinery for dealing with all labour problems. The services concerned with the sanitary control of *food and drink* continued to function as previously described (see this *Bulletin* 1938 Supp p 271*). In June 1938 a Committee was appointed to investigate *nutritional problems* with particular attention to the malnutrition of school-children a scheme for the provision of free meals for necessitous children is to be inaugurated in 1939 (see also *School Hygiene* above). The subject of nutrition received special publicity during the Health Week demonstrations in Kingstown.

The work carried out by *Sanitary Inspectors* during the year is set out in great detail in a series of tabular statements. *Health Propaganda* received special attention and a most successful Health Week was organized.

Port Health Work—One port (unnamed) was quarantined and all vessels arriving therefrom were placed under surveillance. During the year 3 913 vessels entered and 4,234 cleared from Colony ports.

Hospitals Dispensaries etc.—Hospital Returns show that during 1938 there were slightly fewer patients admitted and treated, but an increase in the number of hospital deaths at all institutions 1,988 in patients were treated and 148 died at the Colonial Hospital Kingstown 10 434 out patients were treated.

At the *Dispensaries* 58 591 attendances for treatment were recorded of these 19 835 were attendances of paupers and 28,510 were of labourers children under 14 years of age.

The *Dental Clinic* functions throughout the year but owing to the illness and later resignation of the Resident Surgeon the working of the *Ophthalmic Clinic* had to be suspended.

The *training of nurses* was continued three probationers sat for and were successful at the qualifying examination in general nursing.

According to the returns of the Registrar-General 789 cases of *malaria* were treated and 6 deaths were ascribed to the disease during 1938 representing an incidence double that experienced during the preceding year. As in previous years District 2 South was responsible for the majority of the cases *viz.* 63.5 per cent. of the total recorded. Only 11 patients were treated in hospitals 8 *benign tertian* and 3 *subtertian* all were non-fatal cases. At the Laboratory 9 blood films were

examined for the presence of malaria parasites no findings are recorded.

Of enteric fever 73 cases with 19 deaths were recorded—the highest figures for this disease since 1831. Of the total cases notified 53 cases occurred in the two South Districts and 22 of these in the Richmond Hill area, a suburb of Kingstown. The first case was recorded in May and despite mass inoculation of residents in the entire area, cases continued to occur right down to the end of the year. There were several instances of persons becoming infected who had previously been inoculated. It is observed that water drawn from springs and from the Richmond Hill supply is stored in unprotected barrels. According to a Report of Mr G. H. H. VERNER who investigated the water supplies of the Colony when the existing three filters are at work the filtration rate is nearly two and a quarter times as high as it should be. It may be noted that the three filters are never in use at the same time (see also water supplies above). According to Hospital Returns 79 patients were admitted, 78 were treated for the disease and 20 died.

In the text of the Report it is stated one case of *typhoid* (undefined) was reported but at the Colonial Hospital one case of *amoebic dysentery* and one unidentified case of the disease were treated. During the year 1125 cases of *diarrhoea and enteritis* were treated, 688 of these relating to children under two years of age.

Notified cases of tuberculosis (all forms) numbered 49 and of these 42 were of the pulmonary type of the disease. All the 35 deaths recorded during the year were due to pulmonary tuberculosis. Admissions to the Tuberculosis Sanatorium numbered 9 and 19 patients were under treatment. Two were discharged and seven died. At the Laboratory 32 specimens of sputum were examined for the presence of tubercle bacilli. No findings are recorded. It is recommended that pending the construction of hospital accommodation for tuberculous male patients, temporary accommodation should be provided on the land which is available at the present Tuberculosis Sanatorium. Other respiratory affections were responsible for 4,990 cases and of these 8,809 were bronchitis and 60 were pneumonia cases. 43 deaths were ascribed to the latter disease.

The text of the Report appears to make no mention of the incidence and distribution of *Admiralty diseases* but it is noted that 9,878 cases of *ascariasis* were treated during the year. District 3 and District South accounting for the greatest number of cases.

Two new cases of *leprosy* were certified and admitted to the Leprosarium during the year. At the Laboratory 22 smears were examined for *Mycobacterium leproe* findings are not recorded. The desirability of providing a new leper settlement is receiving the careful consideration of the Government.

General diseases—According to the classified returns 856 cases of syphilis and 919 cases of gonorrhoea and its complications were dealt with at treatment centres. In-patient cases of syphilis numbered 63 and of gonorrhoea 26. The Colonial Hospital dealing with 53 of the former and 20 of the latter patients. The incidence of years appears to be steadily diminishing. 3,948 new cases were treated during the year.

Among other diseases mentioned in the Report appear 2,977 cases of influenza 808 cases of whooping cough 1,206 cases of pernicious and

other *anaemias* 1 171 cases of *diseases of the eye ear and annexa* and 4 446 cases of *diseases of the skin and cellular tissue*

Scientific—During the year 747 specimens of various kinds were examined at the Bacteriological Laboratory but the results of these examinations are not recorded

Financial—Total expenditure during 1938 on Medical Department services amounted to £16 400 a sum which represents 16·1 per cent. of the revenue of the Colony during the same year

TRINIDAD AND TOBAGO (1938)

Trinidad (area 1 884 sq miles) is the most southerly of the West Indian Islands, lying about 16 miles off the coast of Venezuela in latitude 10° N. Tobago (area 116 sq miles) is some 21 miles north-east of Trinidad

Vital Statistics—The population was estimated to number 464 889. Registered births totalled 15 119 and deaths 7 836 the resulting birth and death rates being 32·9 and 15·8 per 1 000 respectively. It is noted that the death rate is the lowest yet recorded for the Colony. The Infant Mortality Rate was 93·4 per 1 000 live births. The vital data are presented in considerable detail.

The Medical Staff—The Director of Medical Services is Dr A. RANKINE no other details are supplied

Maternity and Child Welfare Work—The maternity sections of the various hospitals were severely taxed. Inadequate housing conditions in the towns result in many normal confinements being conducted in hospitals. To all hospitals 2 019 cases were admitted the District Maternity Service in Port-of Spain dealt with 392 deliveries at the homes of mothers and 153 deliveries were also carried out at the hospital maintained by the Child Welfare League at Point Fortin. Child Welfare Work continued to be carried out at the 23 clinic centres of the Child Welfare League. *Ante natal clinics* were well attended and indicate that expectant mothers are beginning to realize the value of ante-natal care

The training of midwives was continued at Port-of Spain and San Fernando 18 candidates were successful during the year and became eligible for registration as midwives.

School Hygiene—School medical inspections were continued along lines previously described (see this *Bulletin* 1939 Supp. p. 282*). During the year 92 schools were visited and 8 625 children examined. The results of these examinations are set out in detail for various areas, but for purposes of this summary it must suffice to say that 7 448 defects were recorded in the children examined the principal conditions being carious teeth malnutrition, enlarged spleens and glands, skin diseases and respiratory affections. Free distribution of fresh milk to school-children in Port-of Spain was commenced in October 1938. Medical inspection of schools has revealed a growing population of unvaccinated children in certain areas steps are being taken to remedy this state of things.

Public Health Sanitation *et c.*—The state of the health of the population was satisfactory. In addition to routine *anti-malarial* measures a considerable amount of survey work was carried out drainage work by Government estate authorities and petroleum companies was considerably extended, and low lying land reclaimed by ploughing and filling-in. As regards *sewage disposal* the sewerage system of Port-of Spain was extended to the Woodbrook area. San Fernando has no sewerage system there was some extension of the *sewerage* *service* in rural areas (see this *Bulletin* 1939 Supp. pp 232-233). Fourteen additional areas were brought into the *central water supply system* various improvements of and extensions to village supplies are described in the Report under review. A *House* *survey* was commenced and results are set out at considerable length in a series of tabular statements. Continued improvement in the routine work of the Health Department. The question of industrial hygiene in connexion with factories has been undertaken. The usual inspection and control of *foodstuffs* was satisfactorily carried out by the Sanitary Inspectors. The problem of *malnutrition* comes under discussion (see this *Bulletin* 1939 Supp p 283*) and attention is drawn to reports of school Medical Officers of early *malnutritional states* among school children.

Port Health Work—Steam and sailing vessels visited numbers 1343 persons inspected on arrival (including crews) 31485 persons placed under surveillance 2040 (2018 for smallport, 22 for typhus) persons vaccinated on arrival 940. Special attention is being devoted to the reduction of the *steptomia* incidence near the Pan-American Airways Base owing to the possibility of the introduction of yellow fever from South American countries.

Hospitals Dispensaries *et c.*—Considerable over-crowding in the *Colonial hospitals* is again reported (see this *Bulletin* 1939 Supp pp 233-234*) a programme of hospital construction to be carried out over a period of five years was prepared meanwhile steps were taken to increase and improve existing accommodation at Colony hospitals.

The figures relating to admissions to Medical Institutions are at variance in different parts of the Report. One statement records 22,128 patients admitted to and 1,945 deaths in 3 Colonial and 8 District Hospitals but in another place these figures become 21,718 and 1,917 respectively.

All the various *out-patient clinics* were well attended. At the out-patient clinics of the Colonial Hospital at Port-of Spain and San Fernando 30,056 new cases were recorded, and of these 12,055 were casual cases, 2,885 were dealt with at the *Ophthalmic Clinic*. In addition 163,267 patients (including paupers and poor persons) were dealt with at District Health Offices (Dispensaries) in Trinidad, and 5,061 at similar centres in Tobago during the year under review. To the *Mental Hospital* 297 patients were admitted, 1,017 were under treatment and 115 died during the year. To the *House of Refuge* 417 infirm and destitute persons were admitted, 1,098 were cared for and 321 died the corresponding figures for the House of Refuge Tobago being 37, 88 and 17 respectively. The *training of Nurses* at the 3 Colonial Hospitals was continued (see this *Bulletin* 1939 Supp p 234*) during the year 32 nurses passed the first year, 23 the second, and 19 the third year examinations.

It is said no difficulty is experienced in obtaining probationer nurses, but it is not easy, to retain the best of those who complete their training.

The malaria incidence remains high but each year recorded cases show a steady decline. The disease is not notifiable total cases reported by District Medical Officers numbered 19 015 and of these 12,009 occurred in the Southern Division of Trinidad. Hospital returns show that 1,381 in patients were treated (1,342 admissions) with 78 deaths types of infection being benign tertian 898 quartan 97 subtertian 277 malarial cachexia 2 and seven fatal cases of blackwater fever. Total deaths in the Colony due to malaria numbered 500.

At the Laboratory 1 899 blood films were examined for the presence of malaria parasites positive findings being as follows *P falciparum* (rings) 294 *P falciparum* (crescents) 13 *P vivax* 43.

No case of smallpox or alastrim was reported during the year 2,341 vaccinations were performed.

There were no cases of human rabies and only two cases in animals. During the year 1 957 Desmodus bats were captured and destroyed. The percentage of infected bats remains high (5-9) and indicates the necessity of maintaining control measures. The work is described at some length and maps are presented showing details of rabies control work (see this Bulletin 1939 Supp pp 286*-287*).

Though a considerable decrease in the number of cases of enteric fever is reported (439 cases 117 deaths) it is said a higher percentage of cases occurred amongst school-children over 50 per cent of the cases occurred in children between the ages 0-15 the majority in the 6-10 age group (see this Bulletin 1939 Supp p 285*). A map showing the distribution of cases is presented. The usual control measures were applied. Hospital returns show that 448 patients were admitted (see above) and 479 treated for the disease 441 of the cases being defined as typhoid, and the remaining 38 unclassified 95 hospital deaths were recorded. At the Laboratory 1 584 were Widal tested and 351 reacted positively. The routine examination was continued of the faeces and urine of hospital patients who recovered from typhoid fever with the object of determining the possible carrier state. Employees in dairies and waterworks were similarly examined. Work was begun on the value of the *Vs* I agglutinins in the detection of the carrier state.

Of dysentery 288 cases were reported and deaths due to this cause in the Colony as a whole numbered 49. Hospital in-patients numbered 131 (125 admissions) with 15 deaths, distributed as to 53 amoebic 62 bacillary and 16 undefined as regards type of infection. Among 1 064 faecal specimens examined at the Laboratory 126 were positive with *E histolytica*.

Notified cases of tuberculosis (all forms) numbered 458 and of these 445 related to the pulmonary type of the disease deaths in the Colony registered as due to pulmonary tuberculosis numbered 381. The Association for the Treatment and Prevention of Tuberculosis continued its valuable work throughout the year (see this Bulletin 1939 Supp p 288*). A Board was appointed to consider the question of acquiring a suitable site for a sanatorium. Specimens of sputum examined at the Laboratory numbered 1 057 and of these 269 were positive with *Mycobacterium tuberculosis*.

Of pneumonia (including broncho-pneumonia) 546 cases were notified with it is said (on p 18 of the Report) 108 deaths. But pneumonia deaths registered in the Colony were as follows (p 16 of the Report)

broncho-pneumonia 169 lobar pneumonia 195 and pneumonia (undefined) 58, making a total of 422 deaths. Hospital in-patients treated for broncho-pneumonia numbered 164 (73 deaths) and other pneumonias 358 (118 deaths).

Antylostomiasis—Two hookworm *ovis* continued at work throughout the year as previously described (see this *Bulletin* 1939 Supp. p. 286*) and cases of hookworm were also treated by District Medical Officers at Health Offices. Total cases reported numbered 7,549 infection rates ranging from 47.1 to 87.9 per cent. Lack of proper sanitation prevents the appreciable reduction of infection rates by treatment provided. Deaths due to the disease in the Colony numbered 118 and hospital in-patients 344 with 25 deaths. Among 1,508 faecal specimens examined at the Laboratory 415 gave positive findings.

Leprosy—The Medical Superintendent of the Leper Settlement contributes a detailed account of the year's work. During the year 92 lepers were admitted, 54 were discharged and 24 died. From the Southern Division Trinidad, 24 cases of leprosy were notified two of these being discovered during school medical inspection. At the Laboratory 98 scrapings and nasal smears were examined and 13 were positive with *Mycobacterium leprae*.

General Diseases and Cases—The new V.D. Clinic at Port-of-Spain was completed (see this *Bulletin* 1939 Supp. p. 287*) and during the year 2,352 cases were treated at this centre. A similar clinic at San Fernando will be necessary as a next step in this important branch of the health services of the Colony. At the hospitals and clinics 2,970 cases of syphilis, 1,345 cases of gonorrhoea and 1,023 cases of *granuloma venereum* and other V.D. were treated. Syphilis is not a notifiable disease at hospitals and clinics 4,621 cases received treatment. At the Laboratory 10,523 specimens were Wassermann-tested, and 5,615 reacted positively, while among 3,723 Kahn tests 2,198 positive reactions were recorded.

Among other diseases mentioned in the Report appear 2,583 cases of influenza with 81 deaths, cancer caused the deaths of 197 people in the Colony and for this cause 235 in-patients were treated with 48 deaths. Though only 45 cases of *dysphtheria* were notified, case mortality was high among 41 hospital in-patients 11 deaths were recorded. *Yersinia* is a serious cause of morbidity and mortality 433 deaths were ascribed to this cause and among 371 in-patients 110 deaths occurred. In the latter part of the year a considerable number of cases of *dengue-like fever* occurred but with no mortality.

Scientific—The Report of the Laboratory Services summarizes the volume of work dealt with during the year 26,579 specimens were examined, the nature of the specimens and results being set out in detail. The principal specimens dealt with have been the subject of brief mention in various sections of the preceding notes. The Report also discusses the special investigations undertaken in connexion with Wassermann and Kahn tests, water examinations, typhoid carriers, and paratyphoid rabies (see also this *Bulletin* 1939 Supp. p. 287*). In addition to the above work 270 detailed *post-mortem* examinations were made on patients dying in the Colonial Hospital, Port-of-Spain, and an account is given of these with distinction of sex, race etc.

Scientific papers published by members of the staff of the Health Department included the following—

- WATERMAN (J. A.) Some notes on scorpion poisoning in Trinidad.—
Trans Roy Soc Trop Med. & Hygiene Vol. 31 No 6
- PAWAN (J. L.) An unusual strain of Rabies Virus in a Vampire Bat.—
Ann Trop Med & Parasit Vol. 32 No 1

Financial—The financial statement continues to be presented in considerable detail. Actual expenditure on Health Department Services amounted to \$1 001 446 representing 9·8 per cent of the total expenditure of the Colony during the same year

SOUTH ATLANTIC

FALKLAND ISLANDS (1938)

The Falkland Islands are situated in the South Atlantic Ocean between 51° and 53° S. latitude and 67° and 62° W. longitude some 480 miles N.E. of Cape Horn and 1 000 miles due south of Monte Video. They consist of East Falkland (area 2 580 sq miles) and West Falkland (2 038 sq miles). There are two groups of dependencies (1) South Georgia, with South Orkney and South Sandwich, and (2) South Shetland and Graham Land. South Georgia lies about 800 miles to the east of the Falkland Islands, and South Orkney and South Sandwich some 450 miles to the south-east and south-west respectively of South Georgia. South Shetland is 500 miles south of the Falklands.

Vital Statistics.—The estimated population on the 31st December 1938 was 2 378. Registered births numbered 41 and deaths 20 the resulting birth and death rates being 17·2 and 8·7 per 1 000 respectively. There were 3 infant deaths. The resident population of the Dependencies was estimated to number 750. An Ordinance to provide for the Registration of Stillbirths was assented to in June. This Ordinance defines stillbirths and makes provision for their registration in the same manner as in the case of live births.

The Medical Staff consists of a Senior Medical Officer (Dr G. KIMNEARD) and two Medical Officers. (Medical service outside Stanley is provided on the public health side for the whole Colony by Government but as regards medical care the Falkland Islands Company maintain a resident Doctor at Darwin who attends to the people in the Company's Camp and those at two other stations).

Maternity and Child Welfare Work.—According to the classified returns 29 deliveries were conducted at the King George VII Memorial Hospital during the year. The Ante-natal Clinic set up in 1937 continued to function with success for it is said that few mothers fail to register and attend for examination and advice. The Infant Welfare Clinic appears to be well established and the services provided fully appreciated (see this Bulletin 1939 Supp. p. 289*). Despite the continued prevalence of diphtheria in Montevideo up to the end of 1937 no steps were taken to immunize the children in the Colony against the disease. A beginning was made in 1938 and though the numbers of children immunized are not stated it would appear that few refusals on the part of parents characterized the introduction of this important work.

School Hygiene.—During the year 230 school-children were medically examined in accordance with usual practice (see this Bulletin 1939 Supp. p. 289*). The principal defects noted were dental caries 31·7 per cent, nose and throat abnormalities 46 per cent, external eye conditions 3 per cent.

Public Health Sanitation etc.—Dr G. Kimneard observes that the re-drafted Bye Laws of the Board of Health were finally approved by the Governor in Council in March 1938. During the year under review the health of the Colony continued to be very good. There are no important sanitary problems in the Falkland Islands. Control of water supplies, sewers and street cleaning in Stanley is exercised by the Public Works Department. There are still some 150 houses (out of a total of 288) without flush lavatories at present the pail system is in use.

As regards *housing* the Board of Health is the Building Authority and a permit is necessary for the erection of new or alterations to existing buildings. *Food control* in respect to the sale and distribution of food is apart from milk and meat exercised by the Board of Health. The control of milk and meat lies with the Agricultural Department. During 1938 a *Nutrition Board* was established with various sub-Committees appointed to deal with specific aspects of nutritional problems. The Investigation Committee inaugurated a Dietary Survey among 46 families in the town of Stanley. The results of this Survey which are set out at length in an Appendix to the Report under review, are summarized briefly, under *Scientific* below (see also this *Bulletin* 1937 Supp. p. 276* 1938, Supp., pp. 283* and 285* and 1939 Supp. p. 290*).

Medical service outside Stanley remains as described in the 1939 issue of this Supplement.

With regard to *Health Education* it is stated that despite the smallness of the population the channels of access are limited. A monthly Health Bulletin is published and radio talks are organized. An attempt to provide a course in Mothercraft for young women did not prove successful and had to be abandoned.

Port Health Work—There is little to add to the description of local arrangements made to deal with incoming vessels (see this *Bulletin* 1939 Supp. p. 291*). Only 27 ships entered Port Stanley during the year 2 from the United Kingdom 5 from Colonial, and 20 from foreign ports.

Hospitals, Dispensaries, etc.—The character of the service in the King Edward VII Memorial Hospital remained unchanged. Admissions to the Hospital numbered 224 (in the classified hospital returns given as 204) and 8 hospital deaths were recorded. There appear to have been 730 new cases treated as out patients and these patients made 1 094 subsequent attendances. In the District 215 first and 580 subsequent visits were recorded for treatment.

New regulations were introduced governing *Nurse Probationers*. Difficulty is experienced in attracting suitable candidates for training as nurses and the new regulations seek to overcome these difficulties by making the terms of employment more attractive while at the same time providing for the systematic training of nurses at the King Edward VII Memorial Hospital and later at a recognized British hospital in the United Kingdom.

The Report of the Medical Officer West Falkland briefly refers to the frequency of his absences from headquarters at Fox Bay in order to visit outlying settlements. No details of cases treated are given.

The Report of the Dental Surgeon provides summary details of the work carried out during the year. He recommends that surplus dental equipment might be utilized to establish a dental surgery at Fox Bay West Falkland.

As regards *morbidity experience* in the Falkland Islands during 1938 Dr. Kinnear observes an almost complete absence of communicable disease save upper respiratory infections and the latter failed to attain epidemic proportions. He adds. It has been held that the Falkland Islander is deteriorating and the reason put forward to account for this has been the widespread intermarriage of the people. Neither the belief nor its explanation appear to have much evidence to support them.

Six cases of tuberculosis are mentioned but only two are said to be active (4 admissions to hospital, 3 being cases of pulmonary tuberculosis). Of other respiratory diseases the 13 hospital cases recorded include 7 cases of broncho-pneumonia and one of lobar pneumonia there were no deaths.

Diseases of the skin and cellular tissue were responsible for 8 in-patient hospital cases but it is stated that over one-third of the attendances for out-patient treatments were for minor skin affections bruises, cuts, etc.

Diseases of the Digestive System accounted for 83 in-patient cases and 2 deaths. Diarrhoea and enteritis continued to occur but was less prevalent. Only 5 appendicectomies were carried out (see this Bulletin 1938, Supp. p. 284* and 1939 Supp., p. 292*). Cases of glandular fever (numbers not stated) were seen towards the end of the year the disease attacked young adults and was particularly severe.

Scientific—Under this heading brief reference can be made to the Dietary Survey carried out in the town of Stanley. This investigation appears to have been the responsibility of Dr. Kinnear, who supplies a detailed account of the enquiry and results obtained in an Appendix to the Report under review. The assembled data relate to a random sample of 48 families of these it was found that 85 per cent. of the population is "very well fed" while a third of the population live on an income basis well below what is necessary to bring the optimum diet within their means. Few of the diets even in the poor-income class were really poor in quality. Practically 100 per cent. used evaporated milk, one in four buying other types. No clinical evidence was obtained in support of the theory of calcium lack in the Colony.

Other investigations carried out during the year included—

- (a) A comparison of the heights and weights of the "milk in-school group with the general school population. The School Dentist worked out the average caries figures for this group and compared them with 1937 records.
- (b) Dr. D. K. Cowan measured the heights of a random sample of the population and groups of grandparents, parents, sons, and daughters with a view to determining whether succeeding generations of Falkland Islanders were deteriorating. results failed to support this view.
- (c) In previous Reports it was suggested that the Islanders seemed to have a familial tendency towards an haemorrhagic diathesis (see this Bulletin 1938, Supp., p. 285*). A beginning was made to investigate this belief.

Financial—Expenditure on Medical and Sanitary Services during 1938 amounted to £5,322, a sum which represents 8.7 per cent. of the total revenue of the Colony during the same year.

VITAL STATISTICAL SUMMARY FOR 1933

Territory	Estimated population	Births	Birth rate	Deaths	Death rate	Infant deaths	I.M.R.	Remarks
WEST AFRICA— Nigeria	See text. Lagos Township 158,500	—	—	—	—	—	—	See text.
Gold Coast	3 789,009 ¹ 340 600 ¹	—	24.0	—	21.6	—	127.0	¹ Native population, estimated.
The Gambia	181,009 ¹ 14,396 ¹	11,266	33.1	7,530	22.1	—	102.0	¹ 135 Registration areas.
Sierra Leone	Freetown, 63,572 Colonys ¹ 41,083 Protectorate, 1 823 636	429 1 463 1 073 2,745	30.2 23.0 26.1 7.1	353 1,378 1,205 1 120	25.6 31.5 29.3 7.1	79 282 286 207	184.1 192.0 250.0 7.1	¹ Protectorate-estimated. ¹ Bathurst only see text. ¹ Ex. Freetown. ¹ Registration incomplete.
EAST AFRICA— Kenya Colony	Europeans and Whites 20 864 "Others" 64,220 Africans, 3 280 777 3 660,220 ¹	— — — 97 757	— — — 26.7	— — — 64 086	— — — 17.6	— — — 14,368	— — — 147.2	¹ See text. ¹ See text. ¹ See text. ¹ For Provincial distribution see text.
Uganda	5 217,345 ¹ Africans, 1,671 637 Europeans and Whites, 1,847	— — 34	— — 16.4	— — 13	— — 7.0	— — —	— — —	¹ See text. ¹ No data available. ¹ Not known—see text.
Tanganyika Nyasaland	Asantiba, 1 746 241 496 346,383 ¹	93 3 441 —	53.2 14.1 —	14 5 040 —	6.0 20.9 —	— — —	— — —	¹ See text. ¹ 1931 Census see text.
Zanzibar Somaliland	Europeans, 13 185 ¹ Africans, 1,377,959 ¹	356 — ¹	26.9 —	129 — ¹	17.4 —	10 — ¹	28.2 —	¹ Conjectural. ¹ No data available see text.
BRONZEA— Northern Rhodesia								

VITAL STATISTICAL SUMMARY FOR 1938—continued.

Territory	Estimated population	Births	Birth rate	Deaths	Death rate	Infant deaths	I.M.R.	Remarks
FAR EAST—cont.								
Singapore Municipality	See p. 116*	—	—	—	—	—	—	
Penang Municipality	171,988 ¹	6,341	36.0	3,011	17.3	670	106.0	¹ For distribution see text.
UNINCORPORATED								
MALAY STATES—								
Johore	709,870 ¹	30,201	42.5	14,001	19.7	5,143	—	¹ For distribution see text.
Kedah	481,242 ²	21,238	44.1	10,575	22.0	—	131.0	² Malaysians 67 per cent of total
Perlis	65,440	1,932	33.7	1,111	20.0	—	111.0	
Kelantan	296,269	13,045	32.6	6,878	17.2	1,457	111.3	
Trengganu	201,370	9,259	41.0	4,785	23.8	1,654	200.3	
OTHER FAR EASTERN POSSESSIONS—								
Brunei	37,866	1,431	37.3	833	22.0	300	210.0	
Hong Kong	1,029,619 ¹	36,883	34.9	38,618	37.7	11,843	324.4	¹ Chinese 1,003,523.
British North Borneo	302,174 ¹	7,959	26.4	8,567	28.3	1,533	196.0	¹ For distribution see text
PACIFIC OCEAN—								
Fiji and Western Pacific	210,518 ¹	7,979	37.6	3,389	16.1	735	92.1	¹ For distribution see text.
British Solomon Islands	94,700 ¹	— ¹	—	— ¹	—	—	—	¹ Natives, 94,000
Gilbert and Ellice Islands	35,512	1,220	36.6	935	28.0	—	—	¹ See text.
WEST ATLANTIC—								
Bahamas	67,720	2,020	29.8	1,222	18.0	290	128.7	

VITAL STATISTICAL SUMMARY FOR 1956—continued.

Territory	Estimated population	Births	Birth rate	Deaths	Death rate	Infant deaths	I.M.R.	Remarks
WEST ATLANTIC—								
Antigua and Barbuda	180 082	8 327	37.6	3 729	19.4	1 183	223.0	
Bermuda	See p. 165							
British Guiana	317 531	10 016	29.7	8 704	23.6	1 081	169.0	
British Honduras	67 767	2 4	35.4	1 2	1.6	7 1	—	¹ For District populations, see text.
Jamaica	1 172 046	37 870	33.4	19 124	18.9	—	129.0	² Data for two districts omitted
Cayman Islands	See p. 177	—	—	—	—	—	—	³ See text
Turks and Caicos Islands	8 200 ⁴	204	26.7	110	20.7	—	123.0	
LEeward ISLANDS—								
Aruba	55 123	1 104	34.1	692	16.9	179	145.9	
St. Christopher and Nevis	See p. 165	—	—	—	—	—	—	
Dominica	60 817	1 474	29.4	642	13.0	120	165.9	
Montserrat	13 670	459	34.3	215	18.4	58	129.2	
Virgin Islands	6 346	183	29.9	121	19.0	43	250.8	
Windward ISLANDS—								
Grenada	89 418	2 045	23.6	1 345	15.2	—	131.2	
St. Lucia	69 081	2 120	30.7	1 623	14.4	209	96.6	
St. Vincent	68 561	2 516	37.4	1 600	17.8	293	153.2	
Trinidad & Tobago	464 689	18 119	37.9	7 606	16.8	—	96.4	
South ATLANTIC—								
Falkland Islands	2 578	61	17.2	20	6.7	3	73.1	

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